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TRUMAN H. NEWBERRY,
Acting Secretary.

NOTE.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

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Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
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II

TABLE OF CONTENTS.

PREFACE	Page. V	
NOTICE TO SERVICE CONTRIBUTORS	VI	
SPECIAL ARTICLES:		
ANTHROPOMETRIC STUDY AT ANNAPOLIS.		
By Lieutenant L. B. Solhaug, Medical Corps, U. S. N.....	1	
MEDICAL AND HYGIENIC ASPECTS OF SUBMARINE SERVICE.		
By Lieutenant Commander E. W. Brown, Medical Corps, U. S. N.....	8	
REPORT ON FACIAL AND JAW INJURIES.		
By Lieutenant Commander L. W. Johnson, Medical Corps, U. S. N.....	17	
MILITARY ORTHOPEDIC HOSPITALS IN THE BRITISH ISLES.		
By Lieutenant R. Hammond, Medical Corps, U. S. N. R. F.....	65	
HISTORICAL:		
MEDICINE IN ROME	103	
EDITORIAL:		
THE NEW YEAR—STANDARDS OF DUTY	127	
IN MEMORIAM:		
EDWARD GRAHAME PARKER.		
By Captain C. E. Riggs, Medical Corps, U. S. N.....	135	
SUGGESTED DEVICES:		
CHANGES IN SCUTTLE BUTTS ABOARD SHIP.		
By Lieutenant Commander J. A. B. Sinclair, Medical Corps, U. S. N. R. F.....	137	
AN EMERGENCY EVACUATION DEVICE	145	
CLINICAL NOTES:		
BRONCHOPULMONARY SPIROCHETOSIS IN AN AMERICAN.		
By Lieutenant G. W. Lewis, Medical Corps, U. S. N.....	149	
ENCEPHALITIS LETHARGICA.		
By Lieutenant A. F. Kuhlman, Medical Corps, U. S. N.....	151	
DEFENSE OF THE OPEN-AIR TREATMENT OF PNEUMONIA.		
By Lieutenant D. Ferguson, jr., Medical Corps, U. S. N.....	153	
NOTES AND COMMENTS:		
Carbon tetrachloride poisoning.—Civil service positions.—Serum treatment in yellow fever.—“Deer-fly disease.”—Request for speci- mens.—Medical personnel of the French Navy.—Centenary cele- brations.— <i>Situs inversus</i> .—Italian view of prohibition.—Effects of prohibition in Chicago.—Treatment of sterility.—Pilocarpine in in- fluenza.—A death from anesthesia.—Free hospital service in Okla- homa City.—Birth rate of Manila.—Expansion of the Faculty of Medicine, Paris.—Statistics on blindness.—French eight-hour law.—Corporation phllanthropy.....		155
REPORTS:		
THE RECEIVING SHIP BARRACKS, NEW YORK.		
By Commander W. G. Farwell and Lieutenant R. M. Krepps, Medical Corps, U. S. N.....	163	
GROUNDING OF THE U. S. S. NORTHERN PACIFIC.		
By Lieutenant J. C. Ruddock, Medical Corps, U. S. N.....	185	
IMPRESSIONS OF A RESERVIST.		
By Commander L. R. G. Crandon, Medical Corps, U. S. N. R. F.....	188	

PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

W. C. BRAISTED,
Surgeon General United States Navy.

v

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterhead, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All material supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

VOL. XIV.

JANUARY, 1920.

No. 1.

SPECIAL ARTICLES.

A COMPARATIVE ANTHROPOMETRIC STUDY.

By L. S. SOLHAUG, Lieutenant, Medical Corps, United States Navy.

The entrance strength test and physical examination of post-graduate student officers at the Naval Academy in June, 1919, together with the strength tests of these same officers as midshipmen, gave opportunity for the following comparative anthropometric study of a group of 41 men, the period of time elapsing between the two tests being 6 years and 11 months.

This strength test, familiar to all naval officers of recent years, is the same test that is given the midshipmen upon entrance to the United States Naval Academy, and, if necessary, at subsequent intervals until each individual has qualified in every muscle group tested. The chart followed appears several times in this report. The standard for the individual varies with his height. The numbers opposite the muscle groups represent pounds. The varying standard for the different heights is based on the results of a study of over 2,000 men made at the Naval Academy, and represents the average pull for these heights as determined in that study. The records of the gynasium furnished the strength-test charts of these 41 officers compiled while they were midshipmen at the academy. The machine used in all these tests is the "J. H. Kellog, Universal Dynamometer."

The 41 men included in this study are drawn from the classes of 1909 to 1914. They have been assigned to sea duty for all but a fractional part of this time. It appears from the records that, as a whole, these men as midshipmen were of a more studious nature, and attained a higher scholastic grade than the average of their fellows. Furthermore, with few exceptions, these men were not of the athletic type, and did not participate heavily in class or intercollegiate sports. From records and individual statements an attempt was made to ascertain in a broad way the actual and comparative athletic activity of these officers, both as midshipmen and as officers in active service. In marking their athletic standing while at the academy, fullest recognition was given to the taking of regular,

sustained, and varied forms of exercise, beyond that prescribed in class routine: to the winning of places on intercollegiate and class teams in the major sports, and to the amount of rather than special skill in exercise taken. For the standing of exercise taken as officers in active service, the highest mark was given to the individual who took well-regulated exercise both ashore, when possible, and daily in his cabin.

Table I.

STANDING IN EXERCISE TAKEN AT THE NAVAL ACADEMY.

Mark.	Number of men.
1.0.....	2
1.5.....	10
2.0.....	15
2.5.....	3
3.0.....	3
3.5.....	3
4.0.....	5
	41

STANDING IN EXERCISE TAKEN IN ACTIVE SERVICE.

Mark.	Number of men.
0.0.....	13
1.0.....	23
1.5.....	2
2.0.....	1
3.0.....	2
	41

A thorough physical examination given at the time of the taking of the strength test in June, 1919, revealed no existing illness or pathological condition of serious nature. At this time, too, were ascertained the number and nature of illnesses or injuries sustained either previous to or succeeding the date of graduation from the academy. In only one case was there a probability of such illness affecting the results of the strength test.

Table II.

NATURE AND DISTRIBUTION OF ILLNESSES SUSTAINED BY THESE OFFICERS AFTER GRADUATION.

Illness.	Number of men.
Influenza.....	6
Hernia (potential).....	1
Necrosis (jaw).....	1
Appendicitis.....	1
Pneumonia.....	1
None.....	10
	31
	41

In the June, 1919, strength test, only 8 of the 41 qualified in the entire test. This is very significant in view of the fact, as stated above, that all midshipmen, before graduation, are required to pass this test without any deficiencies (failure to achieve the given standard of pull for any muscle group). There were a few, however, in this group who as midshipmen failed to qualify in one or two muscles. But to offset this slight handicap of a very few deficiencies in their former test, these men had the advantage of 6 to 10 years' growth and development since that test was taken. And yet only less than one-fifth of the class qualified.

Of 1,763 muscle groups tested 233 were found deficient; these were distributed among the 41 men as follows:

Table III.

DISTRIBUTION OF DEFICIENT MUSCLE GROUPS AMONG THE 41 MEN.

Deficient muscle groups.	Number of men.
1.....	2
2.....	8
3.....	5
4.....	5
5.....	1
7.....	¹ 1
8.....	3
10.....	1
12.....	1
13.....	2
15.....	1
22.....	1
29.....	1
30.....	1
None.....	33
	8
	41

¹This man had a moderate attack of influenza some months preceding the date of the test

Table IV.
DISTRIBUTION OF DEFICIENCIES AMONG MUSCLE GROUPS.

Muscle group.	Number found deficient.
Spirometer.....	3
	3
R. grip.....	14
L. grip.....	13
R. deltoid.....	1
L. deltoid.....	0
R. forearm extensor.....	1
L. forearm extensor.....	0
R. latissimus dorsi.....	7
L. latissimus dorsi.....	8
R. forearm flexor.....	0
L. forearm flexor.....	1
R. forearm supinator.....	3
L. forearm pronator.....	7
R. forearm pronator.....	6
L. forearm supinator.....	4
R. shoulder retractor.....	2
L. shoulder retractor.....	3
R. pectoral.....	5
L. pectoral.....	3
	79
R. foot flexor.....	4
L. foot flexor.....	2
R. foot extensor.....	7
L. foot extensor.....	7
R. thigh flexor.....	2
L. thigh flexor.....	4
R. leg flexor.....	2
L. leg flexor.....	1
R. leg extensor.....	2
L. leg extensor.....	0
R. thigh extensor.....	8
L. thigh extensor.....	10
R. thigh adductor.....	13
L. thigh adductor.....	11
R. thigh abductor.....	4
L. thigh abductor.....	4
	81
Trunk posterior.....	13
Do.....	8
Trunk R. lateral.....	9
Trunk L. lateral.....	8
	36
Neck anterior.....	6
Neck posterior.....	10
Neck R. lateral.....	9
Neck L. lateral.....	9
	34
Total deficiencies.....	233

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In every case a chart was prepared including the graphic curves of both the man's test as midshipman and his present test. This gives at a glance the degree and direction of deterioration of each man's muscle strength. The examples that follow were chosen because they present such different aspects, and yet, upon analysis are seen to be essentially similar.

Special attention is called to these cases because, while exhibiting such great differences in degree of actual strength, and of change of strength, the direction of the change is common to all of them.

In the first place, the greatest loss of strength has occurred in the largest and least actively employed muscles and muscle groups, those of the neck and trunk. The very marked changes found here are indicative not only of loss of actual contractile power, but also of loss of ability to apply these muscles to their full efficiency; in other words, besides loss of muscle strength, there has been lost the habit of using these muscles; this also implies a loss of "form" and coordination.

The thigh muscles show the next greatest loss of strength, with the adductor and abductor groups most weakened; the extensors and flexors follow, the latter group retaining its power well.

Regarding the muscles of the foot, the extensors are more weakened than the flexors.

The muscles of the forearm in general remain quite strong, and in cases where these groups were weak in the former test, a distinct increase in strength is shown in the later examination. The grips, however, are almost invariably weakened.

But while this serves in a very clear manner to indicate the individual, comparative standing of muscle strength, it is not sufficient to allow of specific conclusions as to what has actually occurred to the class as a whole. Therefore, the totals of the height, weight, lung capacity, grips, etc., for the entire class were computed both for the midshipmen and the present test, these totals divided by 41, and the results tabulated and diagramed on a common chart. These curves then, represent the strength tests of the average man of the 41, one taken while a midshipman, the other after a number of years of absence from daily routine exercise, and under the influence of an altered mode of living.

This "average man" took his former examination in July, 1912, when he was 21 years and 4 months of age. He took his present test in June, 1919, at the age of 28 years and 3 months. So the difference between the two tests represents a lapse of time of 6 years and 11 months.

A slight growth in height, 0.3 of an inch, has taken place in the "average man" since he left the academy nearly 7 years ago. He has

lost 1.4 pounds in weight, but has gained in lung capacity, 2.5 c. c., which is exactly proportional to the gain in height.

Comparing in the 1919 test, the record of individuals to that of the "average man," it is to be noted that while the strength curve of the latter runs well above the required standing, actually only 8 of the 41 men qualified. In this respect the curve of strength for the "average man" is misleading, for according to it, one would suppose that well over half the class had passed the test, when as a matter of fact less than one-fifth of them qualified. This seeming paradox finds its explanation in the fact that the actual deficiencies (failure to achieve the given standard) are well scattered among the different muscle groups, and are more than compensated for by the added strength of those who did qualify in such groups. And to avoid the apparent contradiction of points brought forward, emphasis is here laid on the distinction between *deficient* muscle groups and *weakened* muscle groups, for the former are scattered while the latter are grouped; nevertheless, the one is but an advanced stage of the other.

The comparison of the two curves for the "average man" lends positive confirmation to the deductions arrived at in the study of the individual charts. In his 1919 test he falls below his 1912 test in all but a few muscle groups. The greatest fall of strength has taken place in the trunk muscles; the thigh muscles show almost as great a decrease, while the foot extensors are markedly weakened. The muscles of the forearm, the pectorals, the deltoids, and the shoulder retractors pretty well hold their own, in several instances being stronger than at the time of the last test. The latissimus dorsi and the grips, however, have fallen off considerably in power.

In brief this limited study illustrates from every point of view how great a decrease of muscle strength has occurred in the 6 years and 11 months since these officers were midshipmen. It is only a question of what proportion of this loss is due to lost muscle "habit" or co-ordination, which like actual contractile power, is only to be acquired and maintained by constant training. While the actual muscle deficiencies found in the testing of these officers are important, the finding of greatest significance is the decrease of muscle strength of all degrees; for the latter is found in many instances where the former do not as yet exist, and is the real index to a tendency of which the actual deficiency is merely a later manifestation. Lastly, the comparative curve of decreasing strength points out the degree to which the different muscle groups react to a state of inactivity, and the direction of this curve therefore, furnishes a scientific basis for the adoption of exercises suitable for the maintenance of the normal degree of coordination and strength of the different muscle groups.

The conclusions to be drawn from this are quite self-evident. Only by daily, well-regulated exercise can the officers in active service maintain the standard of muscular strength and bodily efficiency developed as midshipmen. To this end several measures have been adopted by the Navy Department, which, however, all fall far short of the mark.

The first of these was that inaugurated during the administration of President Roosevelt. This was an annual test in which an officer had to complete in three days either a 100-mile bicycle ride, a 90-mile horseback ride, or a 50-mile walk. This was nothing more than an endurance test for fitness, and in no direct way contributed to the development and maintenance of the physical endurance which its successful accomplishment demanded. It was later supplanted by the monthly 10-mile walk for all officers. This, while an improvement over the former requirement, is scarcely more than a pleasure walk and furnishes neither the proper amount nor the character of exercise necessary. The last measure adopted, the setting aside of two consecutive hours weekly for every officer in which to take exercise, comes nearer to meeting the demands of the situation. But in itself this is not sufficient. Even under the most favorable circumstances, a man needs to exercise diligently every day to keep in condition. Fifteen minutes of exercise daily is preferable to one 2-hour exercise period weekly.

The successful solution must provide well-regulated exercise daily. It is aboard ship that it is most difficult to maintain one's physical strength and fitness, and with the natural limitations of facilities for exercise attending life at sea, the problem is here more acute than ashore.

In the first place, while compulsory exercise for officers might perhaps be a rather drastic measure, a program of urgent appeal and enthusiastic propaganda should keep the question of physical fitness a live issue and its importance ever present in the fleet. Commanding officers should personally sponsor daily, well-regulated exercise for their officers. This should be designed to include the hardest and most vigorous of the movements in the Swedish system of free-hand exercise, and a liberal amount of competitive exercise with apparatus, and such athletic games as are possible. To do this the quarter-deck would have to be utilized and apparatus furnished. Of the latter, the following are suggested: Medicine balls, chinning bar, parallel supports, punching bag, boxing gloves, wrestling mat, handball, wall and rope (for climbing).

There is nothing in this list too cumbersome for a battleship quarter-deck; in fact, many of the ships are already provided with a few of these articles. The daily program of exercise could be greatly varied, but it should contain a few, say 15 to 20, minutes of Swedish movement, followed by wrestling, boxing, handball, etc., interspersed

with "stunts" on the apparatus. Even where facilities exist for daily athletic contests ashore, such as baseball, this program should not be neglected, for it embodies what most athletic sports fail to give, well-regulated exercise.

Only in some such manner can a proper amount and character of exercise be insured, and only by daily, well-regulated exercise can the larger and less actively employed muscles of the body be prevented from deteriorating in strength and losing their working habit and form.

There is as yet, however, no stable foundation upon which this scheme can be placed. Here we have before us a condition for which proof (if any were needed) has been demonstrated in a scientific manner, furnishing as well a valuable guide to the rational treatment of that condition. We have the means at hand to remedy the situation. But the application of these means is left to the desire and ability of the individual, or to the desire and ability of individuals to cooperate in a rather difficult enterprise. To insure the fullest measure of success of the plan outlined above, two factors are well-nigh essential: First, the proper authorization, making such exercise a daily routine drill not to be willfully neglected; and second, the supervision of this work by specially trained men.

However, in lieu of these features, necessary to develop the highest degree of efficiency in the above-outlined scheme, an active program based on the essential points herein emphasized would be a long step in the right direction for combating the natural tendency to deterioration of muscular strength and physical fitness attending the life of naval officers afloat.

MEDICAL AND HYGIENIC ASPECTS OF THE SUBMARINE SERVICE.

By Lieutenant Commander E. W. BROWN, Medical Corps, United States Navy.

The submarine service presents many special features from the medical and hygienic standpoints, having in this respect a certain analogy to the aviation service. The occupational condition is specialized. There are characteristic hazards and the physical requirements are exceptional.

The environment of the individual on a submarine is difficult to visualize without actual observation of the conditions and a brief résumé of habitability under war conditions such as were met with by the writer with the American Submarine Detachment in European waters may be of interest. The boats referred to are of the L-class and carry approximately 30 officers and men. The air space averages 290 cubic feet per man, which is about half of that allowed on ordinary ships of war. Practically all routine on the boat must

be carried on under artificial light. On the surface the men are subjected to the fumes of oil vapor from the engines; when submerged to the gases from the storage batteries, fumes of cooking, odors of perspiration, bad teeth, rectal emanations, etc.

The ventilation conditions on submarines are of special interest. When cruising on the surface it is, as a rule, practicable to keep only one hatch—the conning tower—open. Ventilation must therefore be largely artificial and is mainly of the exhaust system type. It is therefore not feasible to keep CO_2 anywhere near the limits set by the ordinary ventilation standards.

While CO_2 on the surface does not approximate a harmful percentage from the chemical standpoint it frequently indicates inadequate renewal from the standpoint of odor, movement, and temperature in hot weather. If submerged sufficiently long, however, the physiological effects of increased CO_2 and decreased O_2 come into play. In the *L*-class of boats 2 per cent is taken as the upper permissible limit for CO_2 which is reached in about eight hours. This is in marked contrast to the accepted standard in the ventilation of buildings, 0.08 per cent. Oxygen is allowed to drop to 17 per cent. Air purifiers and oxygen tanks are carried.

The question of heating is of great importance, and has not been solved in our submarines. Dependence is placed upon small electric heaters which are quite inadequate in severe weather. The food situation involves certain limitations, a supply of fresh meat on the *L*-class sufficing for about three days. Beyond that period it is necessary to subsist mainly on canned and other preserved foods. Bread keeps well under submarine conditions.

There are a host of petty discomforts in the submarine environment—the lack of bathing facilities, limitations of storage space, the inaccessibility of the outside atmosphere while on long cruises, and the general monotony of being confined in what may be termed a box of machinery.

One might picture the routine of a submarine personnel in wartime on leaving the base or tender for an eight-day patrol as follows: Submerging at sunrise and remaining under water until darkness. The submerging period in the North Sea in summer covered 20 hours. On coming up the storage batteries are charged, a procedure requiring about three hours. During this surface period, under open-sea conditions, all hatches except the conning tower will be closed, as it is imperative that the submarine be constantly rigged for quick diving. It is on this account that the personnel in general will not have access to the open, with the exception of the few men detailed to the bridge on watch. During the eight days on patrol the bulk of the crew will not have any access to the open air or daylight.

When operating against enemy submarines the personnel will be under a tension peculiar to living under water and being unable to see the enemy.

Variations in atmospheric pressure are characteristic when operating submerged. This is gradually built up incident to a certain unavoidable leakage from the air flasks. This will ordinarily average 2 to 3 inches of mercury. Upon opening up hatches on coming to the surface a sudden release causes considerable discomfort or even actual damage to the hearing apparatus, particularly when the ear has a history of previous disability.

There is also a slight fluctuation of atmospheric pressure when cruising with the engines on the surface. The intake of air is ordinarily through the conning tower and thence to the engine room via the central operating compartment and after battery room. This duct is inadequate to prevent a slight pull on the contained air in the submarine compartments forward. This pulsation is sufficient to be distinctly felt on the tympanum, and becomes very marked to occupants *if a person obstructs the doorway leading to the after battery compartment.*

The dampness of the submarine contributes to the general discomfort. When submerged, the relative humidity of the air rises rapidly and the dewpoint of the contained air being lower than the temperature of the surrounding water, there is considerable condensation and dripping from the bulkheads. There is a tendency to dampness at all times.

ADMINISTRATION OF THE SUBMARINE SERVICE.

At present the head of the submarine service is represented by the director of submarines in the Division of Operations, Navy Department. With him are certain assistants such as aides for personnel, etc. The tenders and corresponding divisions are in turn based on shore stations or bases of which there are three on the Atlantic coast, i. e., at New London, Hampton Roads, and Key West. There is a base at Coco Solo, Canal Zone, Panama, and another at San Pedro on the Pacific coast.

Submarines are organized in divisions made of a variable number of submarines usually of the same class, as the *O*-class, *S*-class, etc., and based on a mobile tender or mother ship. This tender acts as a mother ship for personnel and material, providing living quarters for officers and men and a mobile base for repairs and upkeep. When submarines operate in the immediate vicinity of the tender the officers and men are quartered aboard. Quartered on the tender are the division, medical, supply, and engineer officers

PERSONNEL.

While assignment to submarines is largely voluntary in the case of officers and men, it is not necessarily so. The men receive an addition to their regular pay of \$5 per month and \$1 per dive up to and including 16 dives per month. The officers receive no extra compensation despite the characteristic hazards and hardships of this service.

THE SUBMARINE BASE AT NEW LONDON.

This base is the main center of our submarine activity at the present time. The general organization may be considered under four divisions:

(1) The submarine school. Officers and men are trained for the submarine service at the submarine school at the submarine base, New London, Conn. This school is organized into departments such as the optical school, in connection with periscopes; the gyroscope school; Diesel engine school; storage battery school, etc. The course for officers extends for a series of months. The men are assigned to shorter courses according to the department suitable for their particular specialties such as gyro, periscopic, storage battery, etc. The officers on receiving their certificates are ordered to a submarine and in due course of time become officially qualified as submarine officers.

(2) A division of submarines, operated for the training of officers and men in connection with the school.

(3) A repair and upkeep division for submarines and school.

(4) Temporary attachment of submarines recently commissioned. The present policy being to assign recently constructed boats for a period of two or three months in order that the personnel may be properly trained and the submarines brought to a reliable operating condition before the final assignment to their designated divisions.

MEDICAL ORGANIZATION.

The medical officers of a division, which may consist of as many as 10 boats, are quartered aboard the tender or mother ship. The medical department is made up of a sick-bay space proper, a dispensary, an operating room, an isolation ward, and necessary store-rooms. It is not customary to detail a medical officer or hospital corpsmen to submarines even on protracted cruising. A submarine is, however, equipped with a first-aid outfit made up of suitable medicines and dressings and the crew is instructed in first aid. Special emphasis in first-aid instruction is laid on such matters as eye burns from the sulphuric acid of storage batteries, electric shock,

chlorine poisoning from storage batteries, technique of air purification, use of chlorine gas masks, etc.

STANDARDS OF PHYSICAL EXAMINATION.

While no set standards have been laid down as in the Aviation Service, it is important to exercise great care in the examination of candidates for submarine duty. There are characteristic hazards and disabilities to be considered. Strong eyes are essential on account of the long periods of periscopic use and the fact that practically all work in submarines is done under artificial light which is inherently unsatisfactory in submarines. Sound ears are important in view of the large proportion of ear disabilities which develop. Submarine duty involves particular risk to ears in which there have been any previous defects. It is not a question of accidental injuries but rather of continued exposure to certain damaging conditions so that sooner or later the disability becomes evident. The situation is in close analogy to that of telephone operators. Observation made with this class of workers at intervals in cases with normal or approximately normal hearing have shown very little change even in years of service, while in persons with appreciable defects of hearing on entering the service a further loss is noticeable after prolonged occupation in telephone work. Variations in atmospheric pressure are important, in this relation, as continued exposure to increased pressure with the subsequent return to normal pressure, if too rapidly made, results in circulatory changes in the middle ear, impairing the hearing. In the earlier stages of impairment of hearing as the result of exposure to loud and continuous noise, such as the operation of Diesel engines, clinical observation shows depression of the membrana tympani consequent upon retraction of the tensor tympani muscle—this objective evidence appearing in advance of the thickening process in the middle ear.

Eyestrain.—The use of the periscope tends to produce eyestrain as it involves prolonged use of the eyes. The protracted use of unsuitable lenses is certain to entail definite subjective symptoms such as headaches and pain in the eyes. In persons in whom astigmatism is present the use of improper lenses accentuates the error and rapidly produces pain in the eyes and headaches. It is therefore very important to reject individuals with a definite refractive error. Officers should be free from the predisposing causes of eyestrain. When debilitated from inferior hygienic surroundings there is a greater tendency to eyestrain.

Eyestrain is a convenient modern expression, and may be taken to mean that the eyes can not be used as they should be in health without entailing a strain upon the muscles, extrinsic or intrinsic, of the

eye, which in turn betrays its presence by local or general discomfort. The condition may arise in individuals in whom an error of refraction or astigmatism is present or in whom there is a loss of balance of the external muscle of the eye when sustained accommodation and convergence are required. On the other hand, it may occur in subjects in whom none of these defects are present, but in whom accommodation and convergence are unduly strained by prolonged use of the eye for near vision. The condition tends to be worse at night and in artificial light.

DISEASES CHARACTERISTIC OF SUBMARINES.

Diesel engine deafness and eyestrain have already been discussed at length. A rash, designated as "fuel-oil rash," has been reported at various times in the British submarine service. The lesions are suggestive of scabies, are very resistant to treatment, and are induced by some constituent or constituents of certain types of fuel oil.

Intestinal stasis is characteristically prevalent in submarines. This is the result of confinement in a cramped space with enforced physical inactivity and the use of an overconcentrated diet. This has proved to be an obstinate feature of submarine routine.

Electric welding.—Submarine tenders are equipped with electric welding plants. In this process the light produced is very intense (equal to almost 8,000 candlepower) and as the operation has to be closely observed, the workmen must protect their eyesight by shields composed of alternating layers of colored glass. The light and heat evolved are sufficiently intense to cause a condition of the skin comparable to sunburn. This electric light is redundant with ultra-violet rays which may produce lesions of the conjunctiva, cornea, and retina, the symptom-complex being conveniently designated as "electrical ophthalmia." A considerable number of cases have been reported. The screen employed is a combination of medium green and red. Its proper use is of the utmost importance.

Nose and throat affections.—These are encountered among submarine men with great frequency, the submarine environment apparently favoring the occurrence of catarrhal conditions of the nose and throat, although it is probably in most instances an aggravation of a preexisting condition. Undue dryness of the air of interiors is said to aggravate existing nose and throat affections. The situation in submarines can not be accounted for by low, relative humidities as, on the contrary, the relative moisture tends to be high, particularly when submerged. In fact, it tends to be much higher than in large ships or in homes, schools, and office buildings. Temperature conditions, however, may be a factor. The temperature of submarines in the winter season is unduly low as a rule, owing to difficulties in

heating. Under such circumstances catarrhal conditions would tend to get worse, coldness of the hands and feet favoring congestion of the nasal mucous membrane.

There are, however, other conditions in submarines which are capable of having an untoward effect upon the mucous membranes of the nose and throat. There is as a rule a varying amount of "oil fog," originating largely from the relief valves of the engines, in the engine room. At times this is very dense, extending to adjoining compartments and inducing an annoying irritation of the nose and throat. The fumes of cooking—frying in particular—containing acrolein and related volatile bodies produce irritation of the eye, nose, and throat. Another contributory factor is the irritation from the batteries due to sulphuric acid spray—this is more marked in a heavy sea with marked rolling, submerged—the acid being evolved and carried off mechanically with the evolution of hydrogen from the cells during discharge. This material produces at times sufficient irritation to give rise to coughing and sneezing.

The submarine is not a habitable vessel for a prolonged period without physical deterioration. This had even been noted in the case of officers and men under peace conditions, but under war routine when patrol periods averaged 8 to 10 days at sea this tendency was especially marked. The lack of physical exercise, the unfavorable air conditions, the artificial light, the monotony and the crowded condition all tend to a lowering of resistance or even to exhaustion. Exhaustion is insidious and may not be demonstrated until the individual is overcome by one or the other of its symptoms. Relaxation and change are of the greatest importance to the submarine personnel, and with it keenness and the prevention of the condition known as staleness.

ACCIDENTS IN SUBMARINES.

The submarine is liable to certain characteristic accidents, which may be grouped as follows:

(a) *Battery explosions.*—Toward the end of charging large quantities of hydrogen are given off from the cells, and it is imperative that the ventilation be adequate to insure sufficient dilution below the explosion point, which varies from 8 to 10 per cent. If such an explosive mixture is formed, there will be a serious risk involved in view of the danger of electric flashes from short-circuiting and possible touching off of the mixture below decks. A number of such explosions have occurred. The importance of reliable tests for the efficient supply of air to the storage batteries and the determination of the per cent of hydrogen present is obvious.

(b) *Chlorine poisoning.*—Chlorine will be evolved if salt water has access to storage batteries under discharge conditions. The high

toxicity of chlorine and its physiological effects are too well known to merit any special mention here. Flooding of the battery cells has occurred in the following manner: while on the surface, air is drawn over the cells to prevent the accumulation of an overdue percentage of hydrogen and is discharged by a blower through a ventilator alongside of the conning tower. During surface cruising in heavy seas salt water has gained access to the battery. Prior to diving this ventilator is unshipped and the valve secured. Failure to close this valve on submerging has occurred and the battery has been flooded with sea water. Until the battery was shut off chlorine was rapidly evolved and a number of cases of chlorine poisoning resulted. Such a situation would involve grave possibilities if the submarine could not be immediately brought to the surface.

ARSENIURETTED HYDROGEN POISONING (AsH_3).

Serious outbreaks of poisoning by this gas occurred in submarines of the British, French, and Italian navies during the war. In certain British submarines the actual source of the poisoning was not at first suspected from the clinical picture. Jaundice and a marked anemia were prominent symptoms; vomiting and dyspnea were most complained of and the majority of cases reported neuritic symptoms. Dyspnea was considered as probably due to destruction of and interference with the oxygen-carrying capacity of the red corpuscles.

Arseniuretted hydrogen was recovered from the storage-battery gases of the submarines referred to and arsenic was eventually found in the urine, nails, and hair of certain cases of poisoning.

The source of the gas was at first believed to be in the sulphuric acid of the storage batteries and in fact, this acid always does contain very minute traces of arsenic. This arsenical impurity was finally traced to the battery grids where it was present in the form of an alloy. Nascent hydrogen liberated while the storage battery is gassing reacts with this arsenical compound producing AsH_3 . The remedy for the situation was found in the rejection of all battery plates containing more than specified minimum traces of arsenic.

In certain of our own submarines very minute traces of arseniuretted hydrogen were constantly found on prolonged submergence, but never sufficient to induce any deleterious effects.

AIR PURIFICATION.

The purification of air in submarines soon assumed great importance, both from the military and humanitarian standpoint, shortly after the opening of the war. While boats could remain submerged for periods of about 8 hours without inconvenience, certain exigencies were liable to arise requiring submergence for 24 hours, or even

longer. In prewar days the question was of no great practical importance, as the periods of submergence were very short.

The essentials of the problem were: (1) The absorption of CO_2 , and (2) the supply of oxygen. The difficulties in the development of equipment were mainly due to limitations of weight and space. Such considerations are of the utmost importance in submarines and cumbersome apparatus is not feasible. The question of the allowable upper limit of CO_2 and lower limit of oxygen was determined by actual experiments aboard submarines, and the standards adopted are stated on page 9. While these limits can be considerably exceeded in emergencies without actual danger, definite deleterious effects appear, impairing the efficiency of the personnel. It was found on an average during submergences that a man gave off 0.7 cubic feet of CO_2 per hour and consumed 0.9 cubic feet of oxygen. It will therefore be seen that knowing the free-air space and the number of persons aboard the time interval for CO_2 to reach 2 per cent can be readily computed. Curves can be constructed applicable to all classes of boats.

The successful apparatus for the removal of CO_2 and used by American submarines during the war was devised by Prof. W. E. Gibbs, of the Bureau of Mines, and is, in turn, a modification of the apparatus developed by Prof. Haldane and employed in British boats. The Gibbs apparatus consists of a can 14 inches high and 12 inches in diameter with a cone-shaped screen in the bottom covered by a 12 to 13 inch layer of the chemical which absorbs the CO_2 . When required for use a small cover is removed and the chemical in the container placed on top of a small blower, the air being forced through the chemical. The U. S. S. *O-10* carried out a continuous submergence of four days by the use of this apparatus with no indication of unfavorable effects. Oxygen was carried in our submarines in compressed form in tanks, its use being reserved for emergencies only.

TRAINING OF THE SUBMARINE MEDICAL OFFICER.

It will be obvious from the foregoing that the submarine medical officer is a distinct specialist in one phase of naval activity. He must have special knowledge of ventilation and gases in their relations to submarines; of the technique of air purification and the effects of increased CO_2 and decreased oxygen from the physiological standpoint; of such gases as chlorine and arsenic; of the physiological effects of air pressure; of the functional tests for vision and hearing and of the treatment of such defects; of the physics and physiology of diving; and a special knowledge of the proper conditioning of men for this very exacting and arduous form of naval service. He is, in addition, frequently called into consultation on matters con-

nected with the examination of water for battery purposes, of battery electrolyte analysis for impurities, and the testing of fuel and lubricating oils for sea-water contamination.

**QUEEN'S HOSPITAL FOR FACIAL AND JAW INJURIES, FROGNAL, SIDCUP,
KENT, ENGLAND.**

By L. W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy.

PART I. THE HOSPITAL—History and topography—Construction—Equipment and furnishings—Organization and administration.

PART II. THE WORK OF THE HOSPITAL—The tubed flap—Eyelids and eye sockets—Rhynoplasty—Lip and chin plastics—Repair of bone injuries—Prosthetic appliances—Postoperative infections—Methods of anesthesia.

I.

This is a military hospital, established under the patronage of the Queen, for the care and treatment of officers and men of the Army and Navy suffering from facial and jaw injuries. It is the principal hospital of this class in the United Kingdom and to it all the worst cases are sent.

The commandant of the hospital, Lieut. Col. J. R. Colvin, of the British Army, is occupied solely with nonmedical matters, being responsible to the War Office for the discipline of the establishment and to the committee for the material side of its administration. His conduct of affairs has contributed in a marked degree to the furtherance of the high aims of the professional staff.

Credit for the existence of this institution belongs to Maj. H. D. Gillies, R. A. M. C., who, while serving with the Red Cross in France in 1914 and 1915, conceived the idea of a great institution devoted solely to this class of cases. As a result of his activity, a beginning was made by assigning to him 20 beds at the Cambridge Hospital, Aldershot. This number increased rapidly until he had 200 beds, and hundreds of cases could not be accommodated. The need for expansion was imperative, but there were no further facilities available at Aldershot. It had been found also that men with mutilated faces in the same hospital with others who were not disfigured became morose and depressed and so conscious of their affliction that they refused to visit their homes or friends or to associate with other patients. Therefore it was decided to secure a separate institution for these cases.

A 320-bed hospital was established in the grounds of Frognal House, Sidcup, and removal to the present hospital was completed in August, 1917. Enlargement of the institution continued, and there are at present about 550 beds in the Frognal wards, while the auxiliaries provide for several hundred more.

The hospital is situated in the outskirts of the town of Sidcup, parish of Foots Cray, County Kent, which is within the metropolitan district of London, about 12 miles from Charing Cross Station, on the South Eastern & Chatham Railway.

Frognal is a beautiful example of the English country estate. Readers of Thomas Hardy and those who have enjoyed Mr. Sponge's "Sporting Tour" would recognize the type at once. I was told that during the reign of George III, in the days when we disagreed with Britain's foreign policy, it was the residence of the father of the revenue law which led to the dumping of certain chests of tea into Boston Harbor by citizens camouflaged as Indians. The newest parts of the house are over 200 years old and the lawns are the result of many generations of care. They could exist only in a country where time and labor were the cheapest of commodities.

The buildings first erected, known as the hutted hospital, are arranged in the form of a narrow horseshoe (fig. 1), a covered runway or duckboard from which the wards radiate. Across what would correspond to the open end of the horseshoe are the offices, and beyond these to the east are the mess hall, kitchens, power house, recreation hall, and service buildings. Inside the horseshoe, at the opposite end, are the offices and operating theater of the British section. Extending from side to side at the middle of the horseshoe is a wing containing a small operating theater, also rooms for massage and therapeutic electricity, X-ray, photographic, and nose and throat departments. A building for the dental department, containing mechanical laboratories and operating rooms, extends from this wing toward the office building.

From the northeast another duckboard leads to the Canadian, Australian, and New Zealand sections, which are of later construction. This runway has on its left the Canadian operating theater, record rooms, and offices, and beyond this a series of wards. On the right are the Canadian building for mechanical and operative dentistry, the offices, record rooms, and operating theaters for the Australian and New Zealand sections.

Frognal House, about 150 yards from the hospital, is used for officers' messes on the ground floor and quarters for the sisters on the floor above. Other buildings for quartering and messing the sisters and V. A. D.'s have been built near the house.

A farm of about 100 acres is part of the institution; it is a source of vegetables, poultry, and dairy products for the use of the hospital, and it also provides employment and training for convalescent patients.

Five houses located in towns near Sidcup are used as auxiliaries to the hospital (fig. 2). Their capacities vary from 20 to 160 men. The patients are sent to these places to recuperate between opera-

tions. Provision is here made for all manner of recreation and amusement. There are also gardens and vocational training schools for various trades.

The first buildings to be erected, those around the horseshoe, are of wood framework with steel staybolts, covered inside and out with

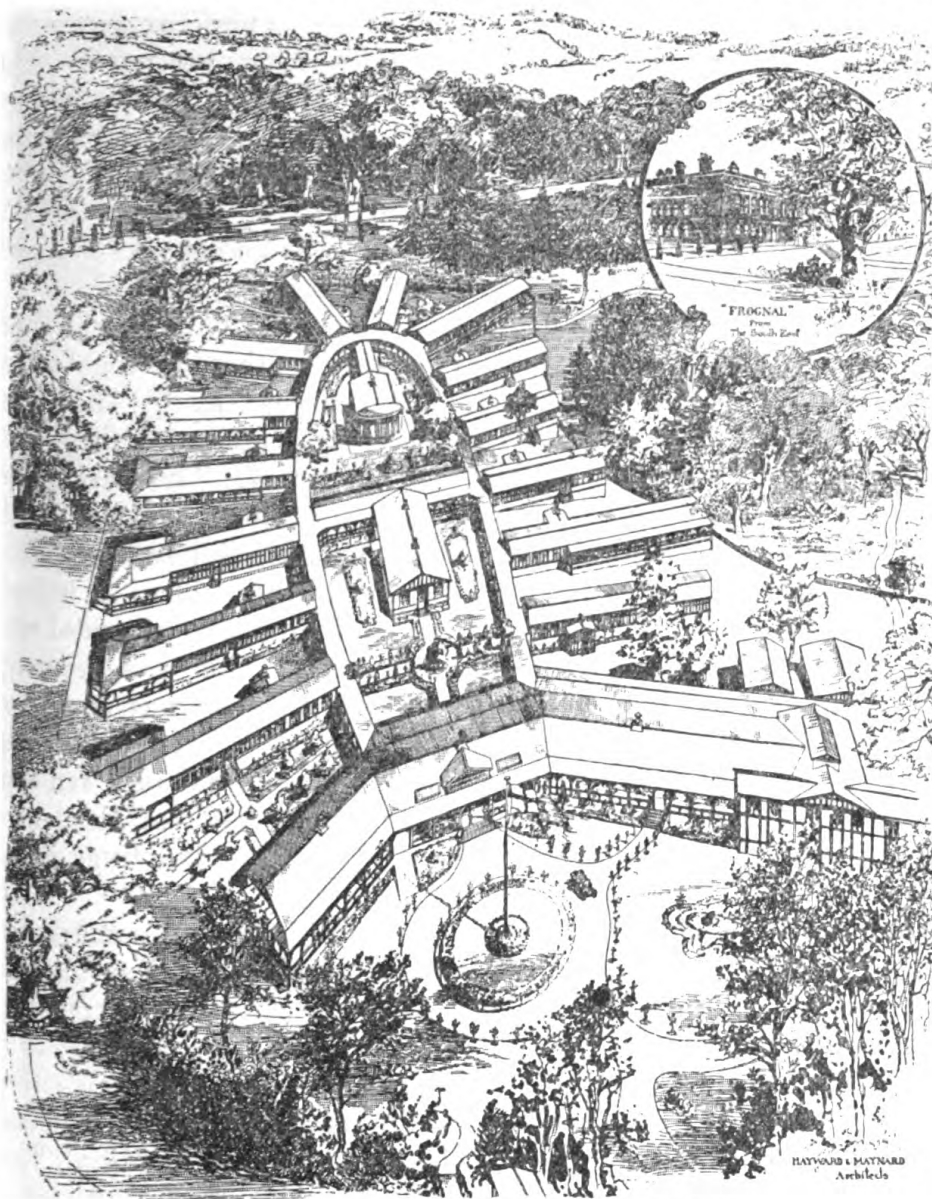


FIG. 1.—Queen's Hospital from the architect's drawing.

an asbestos board known by the trade name of Uralite (fig. 3). The joints between the boards are covered with wood strips. The boards are painted a light buff and the wood strips a dark brown. These buildings are reasonable in cost, sanitary, and sufficiently fire-proof to allow evacuation of the patients in case of fire. They are well lighted and ventilated and are pleasing in appearance (figs. 4 and 5).

When the later buildings were erected there was a serious shortage of lumber and also of asbestos, the principal sources of which were in Russia and in the Black Lake Mountain district of Canada, so it was decided to build them of concrete. The uprights, arches, and sills of these wards are of reinforced concrete cast in standard molds and allowed to stand for two to three weeks. They are then erected in proper position and the walls and floors are poured in molds with expanded metal reinforcement. At first the arches and uprights were cast in one, but the erection of these heavy units proved so laborious that it was found better to cast them separately, erect the uprights, and then superpose the arches. I was told that this method of constructing concrete buildings was known as the American method (figs. 6 to 10).

The walls are finished smooth inside and painted a light cream color. The door and window frames and other fittings are of wood, painted a dark brown. Lighting is electric, by the direct-indirect method. Heat is provided by steam radiators. The wards are light, well ventilated, sanitary, and fireproof. They are of two sizes—25-bed, costing \$10,000, and 50-bed, costing \$20,000 to build.

The British operating theater is of concrete, oval in shape, providing space and equipment for two operating tables to be used at the same time. The large plate-glass windows are provided with heavy steel shutters for use during air raids. This was necessary, as Sidcup was on the direct route of German machines coming to bombard London and the Woolwich Arsenal. Several air inlets are situated about 2 feet above the floor, and an exhaust fan near the ceiling provides for ventilation. A curious result of the failure to screen the air inlets is the constant presence of ladybugs in the operating room.

The other buildings show nothing new in the way of construction except that the operating theater of the Australian and New Zealand units provides a very satisfactory arrangement of two operating suites in one building.

The furniture, instruments, and appliances of the Queen's Hospital are, in general, similar to those in use in our naval hospitals. They differ in certain details which are worthy of mention. Low black iron beds are used in the wards (fig. 11). These are not so convenient, sanitary, or good-looking as our standard hospital beds, and the springs and mattresses are not so comfortable. A bedside locker and a comfortable chair are provided for each patient, and there are plenty of flowers, books, and gramophones.

The operating rooms are modern in every detail. Many very fine needles and small needle holders, such as are used in eye work, are provided for delicate skin sutures. Horsehair is the usual suture material. The special anesthetic apparatus will be described in an-



Fig. 2.—Queen's Hospital and auxiliaries.

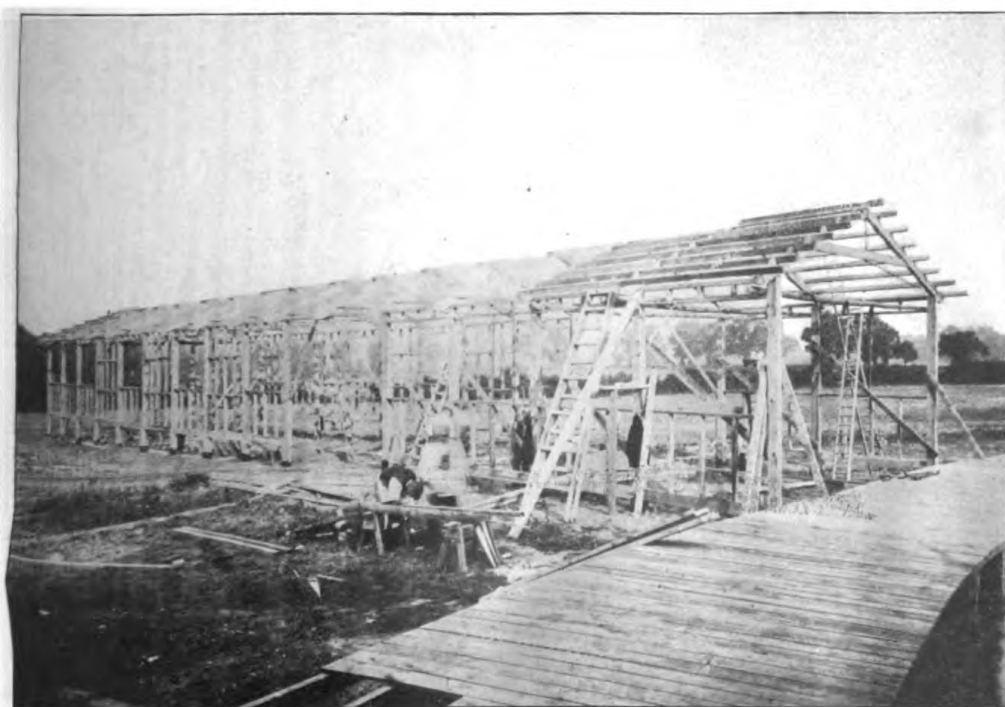


Fig. 3.—Framework of wooden ward.

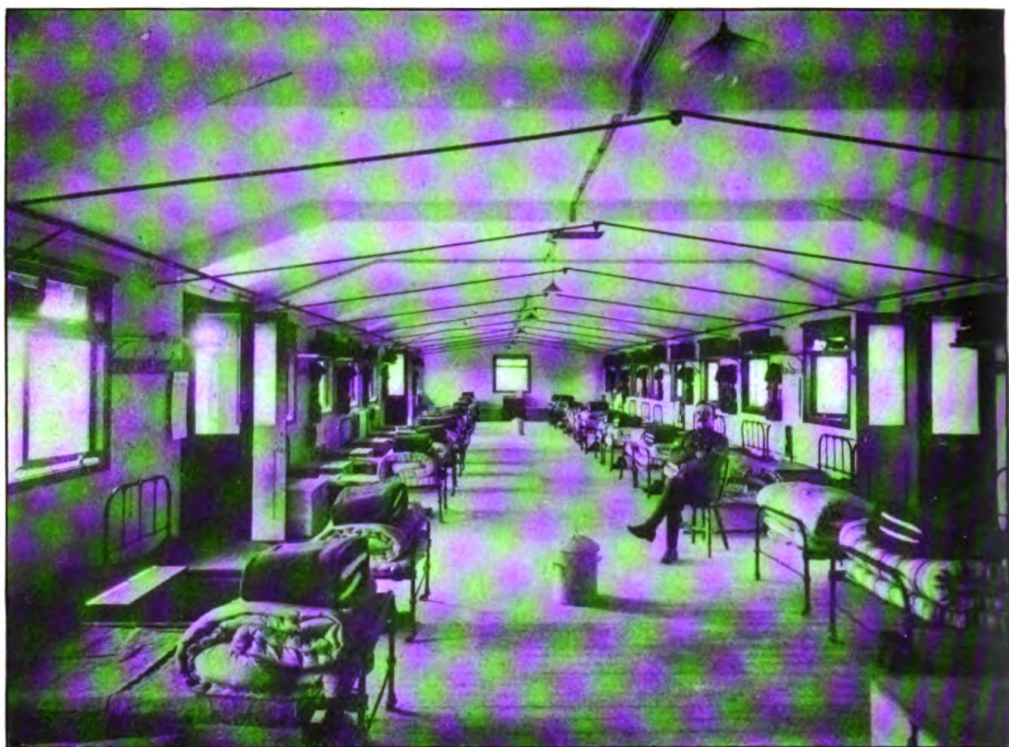


Fig. 4.—Orderly barracks. Typical wooden building.



Fig. 5.—Interior of wooden ward. Christmas decorations.

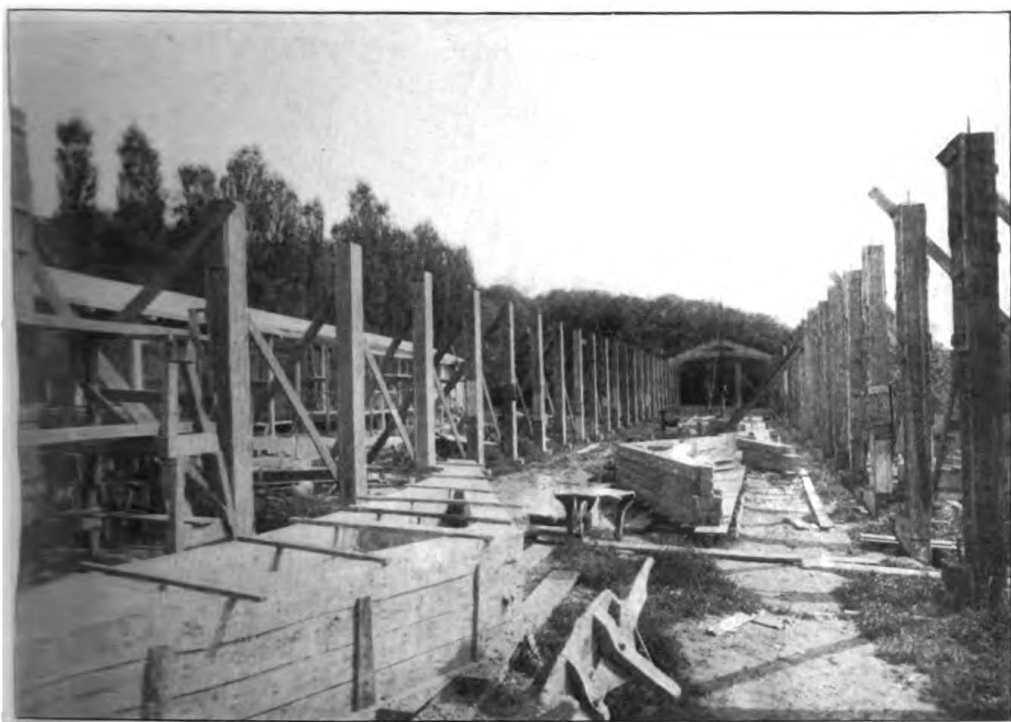


Fig. 6.—Construction of concrete ward. Pillars erected and arches cast.

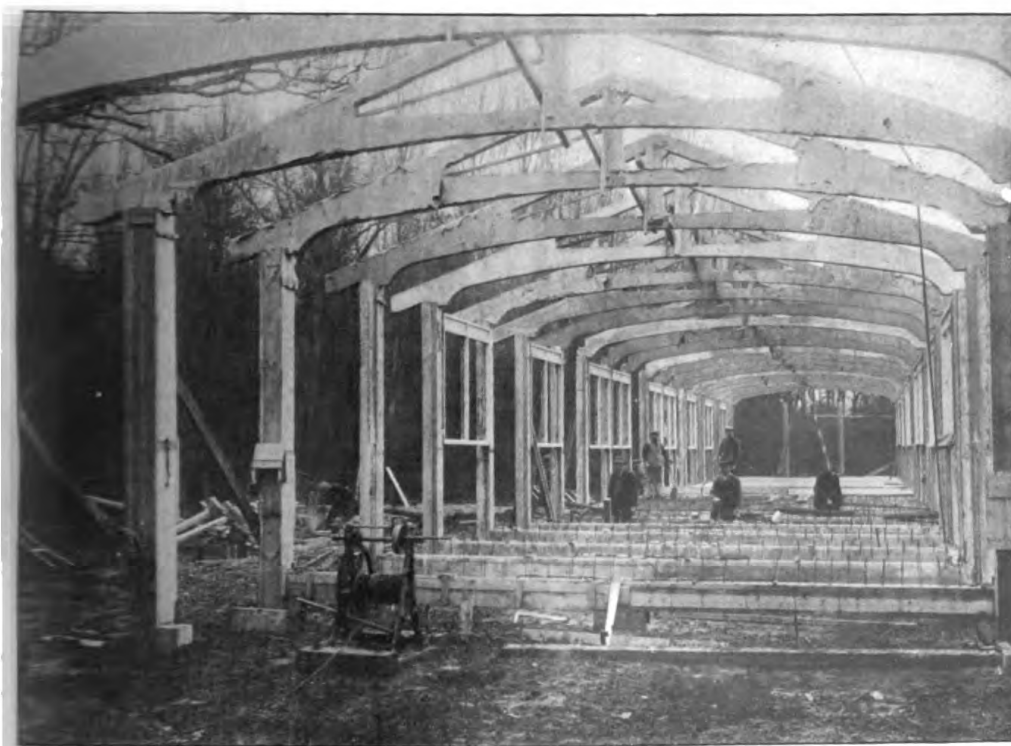


Fig. 7.—Construction of concrete ward. Supports for roof and floor in place.



Fig. 8.—Exterior of concrete ward.



Fig. 9.—Interior of concrete ward.

other place, together with the methods of use. Very small knives are used for skin incisions and are sent away to be sharpened after each time used. This necessitates carrying a very large stock. American knives with detachable blades were in some of the operating rooms and I heard them very favorably mentioned.

Apparently no satisfactory type of saw for mandibular bone grafts has been developed. Maj. Chubb, who does most of the bone-graft work, uses a small saw much like that generally used for fixed dressings. Another operator uses an ordinary carpenter's miter saw with part of the blade removed. Both are still searching for a more suitable instrument. A motor-driven saw patterned after the Albee saw, but much heavier and bulkier, is provided but is rarely used because it forms short circuits and the operator has to stand on an elaborate wood platform to avoid being shocked while using it. Maj. Chubb believes that the use of a rapidly revolving saw eburnates the edges of the bone and lessens the chances of a successful graft.

Patients are transported to the operating table on a very simple, ingenious, and satisfactory wheeled stretcher or trolley. The frame is of metal, nickel plated, with rubber-tired wheels. On this rests the canvas stretcher, kept taut by steel piping passed through a loop extending down each side. The patient is placed on this stretcher to be anesthetized. The stretcher and patient are then lifted to the operating table. The canvas is left in place under the patient and the pipes removed. After the operation the pipes are inserted in the loops and stretcher and patient are lifted from the table to the trolley.

Col. H. S. Newlands, of the Australian section, has adapted a dental chair for use as an operating table (figs. 12 and 13). This provides for operating in either the sitting or prone position. It is found very convenient to be able to raise, lower, and rotate the table during operation. The adjustable headrest holds the head firmly in any position desired by the operator.

The X-ray room is well equipped for head work and localization of foreign bodies. It has its own developing and printing outfit. Under this department also are the masseurs. Massage is considered by the surgeons to be a most valuable adjunct to their work, particularly in the skin graft cases. There are appliances for vibratory massage, therapeutic application of electricity, violet ray, radiant heat, Finsen ray, and high-frequency current.

Photographs of the cases are made at each stage and these form a very important part of the records of the hospital. There are three well-equipped photographic departments for the various sections and each section keeps its own complete records. Plaster casts are also taken of the cases and a laboratory is set aside for this

work. Wax and plaster models showing various injuries and surgical procedures, also many valuable drawings and specimens are prepared here for deposit in the hospital museum.

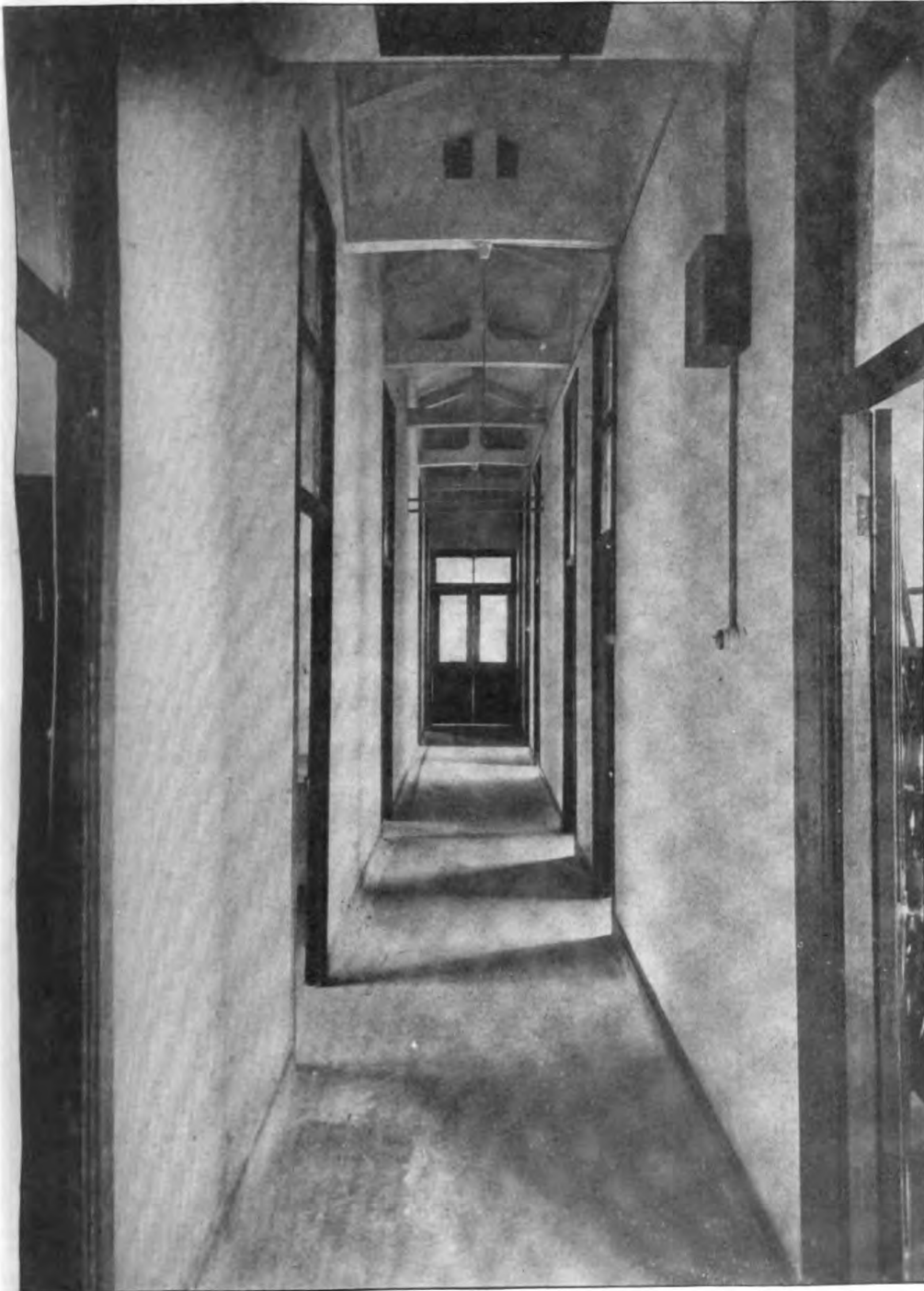
The power house has six horizontal boilers, each with its separate stack. Steam is furnished for heating the buildings, sterilizing in the operating theaters, and cooking in the kitchen. The power house is run by the contractor who supplied the boilers. He provides the labor and coal and is paid on the cost-plus per cent plan. The profit has recently been reduced to 5 per cent. This system is said to be very satisfactory. It costs more but saves much time and labor in the accounting department.

The kitchen (fig. 14) has steam kettles and gas cookers. They are a very efficient and cleanly combination. The vegetable cookers produce potatoes thoroughly cooked without being soggy or crumbly, an important consideration when they have to be handled several times before reaching the ultimate consumer. Storerooms open off the kitchen at one side, and across one end is a counter over which the food is served to men who bring the diet carts from the wards. At the other side is a counter across which food is served to the ambulatory patients in the mess hall. The kitchen is cool and light and I was impressed with the celerity and lack of confusion in serving the meals.

Dental operating rooms and mechanical laboratories are provided (fig. 15), and here a great variety of splints and prosthetic appliances are made. Dentists are an important factor in the work of the hospital. There is a large dental staff with each section and these officers assist and advise in many operations.

The British, Canadian, Australian, and New Zealand sections have each their own independent organization, coordinated under the commanding officer as shown in the diagram. The commanding officer has a major for adjutant and registrar. One of the junior medical officers acts as orderly officer and has charge, for disciplinary purposes, of the R. A. M. C. men who are attached to the hospital and correspond to our hospital corpsmen. Because of the shortage of men there are very few of these, their places being taken by the V. A. D.'s.

Queen Mary's Volunteer Aid Detachment, the members of which are known as V. A. D.'s, dates from 1908, when the training of volunteer women for first-aid work was begun. After the war began the organization became a source from which partly trained women nurses were obtained to release men of the R. A. M. C. for duty in France. Its members serve with the Army and Navy in all parts of the world. Besides the nursing section there are the general service and labor sections who do the work of men in all branches. At this hospital the V. A. D.'s act as cooks, dispensers,



22-1

Fig. 10.—Corridor and service rooms of concrete ward.

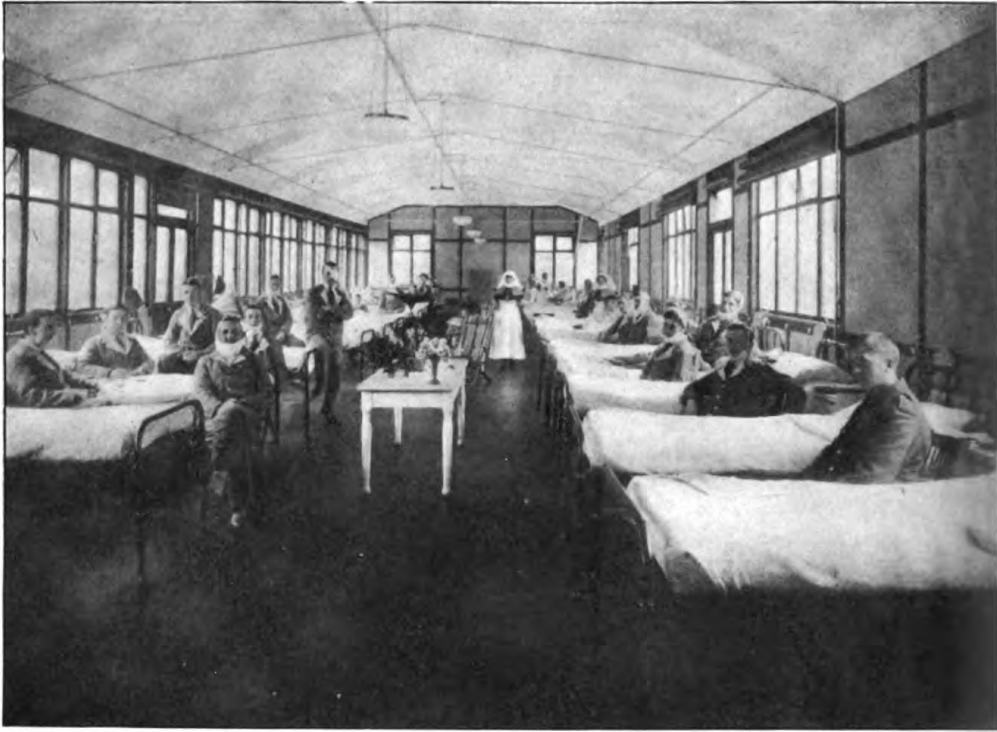


Fig. 11.—Typical ward furnishings.

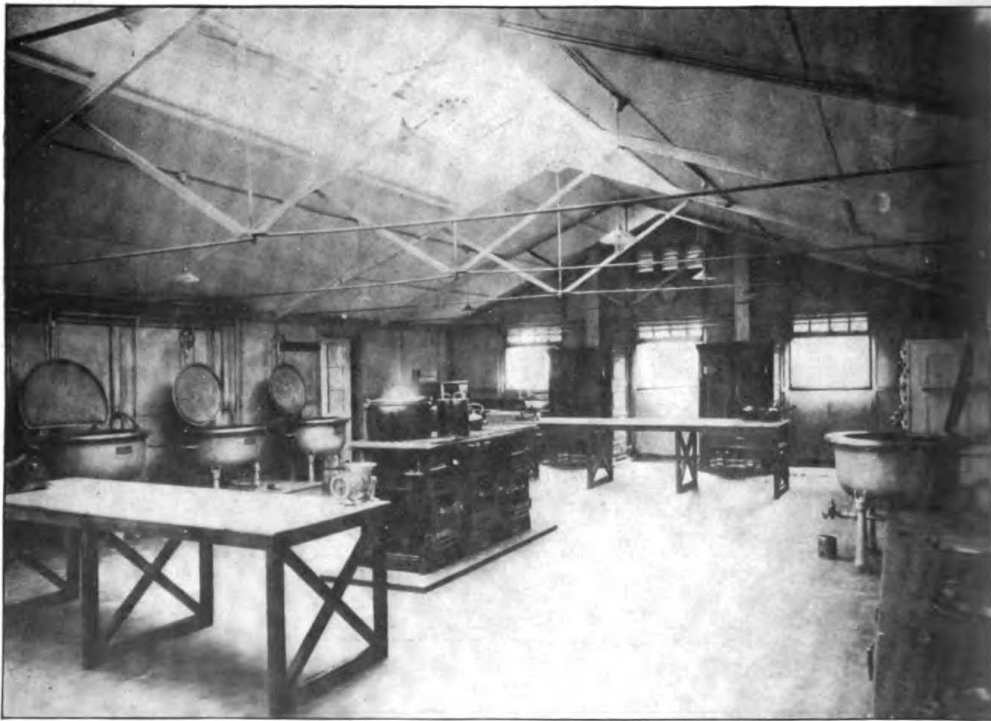


Fig. 14.—Kitchen. Gas ranges in center; vegetable cookers in background.

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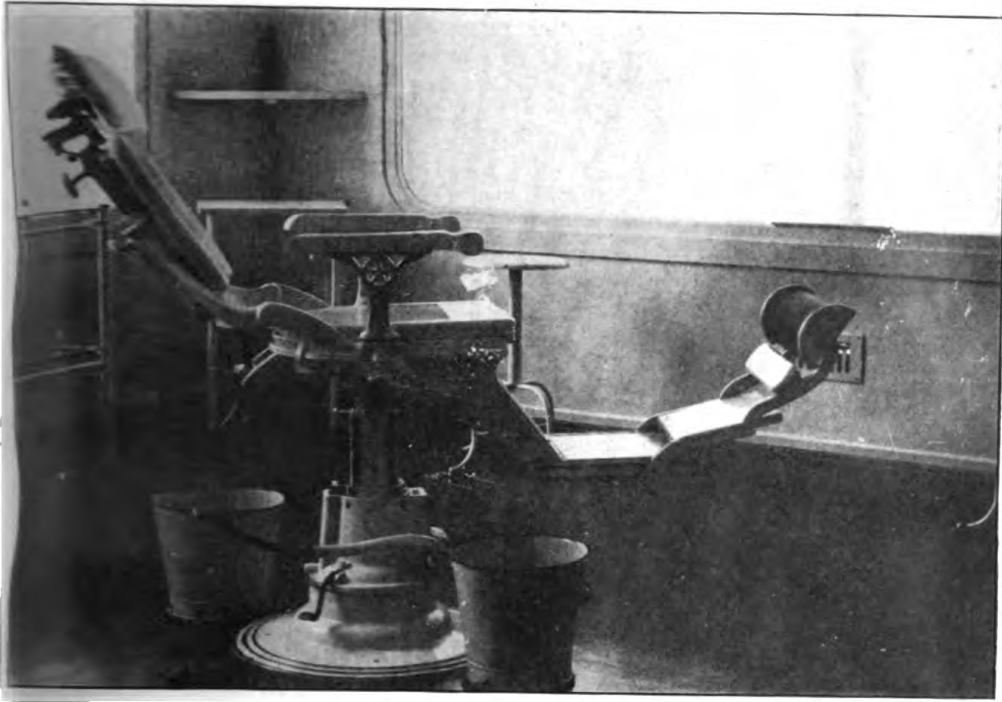


Fig. 12.—Dental chair used for operating.

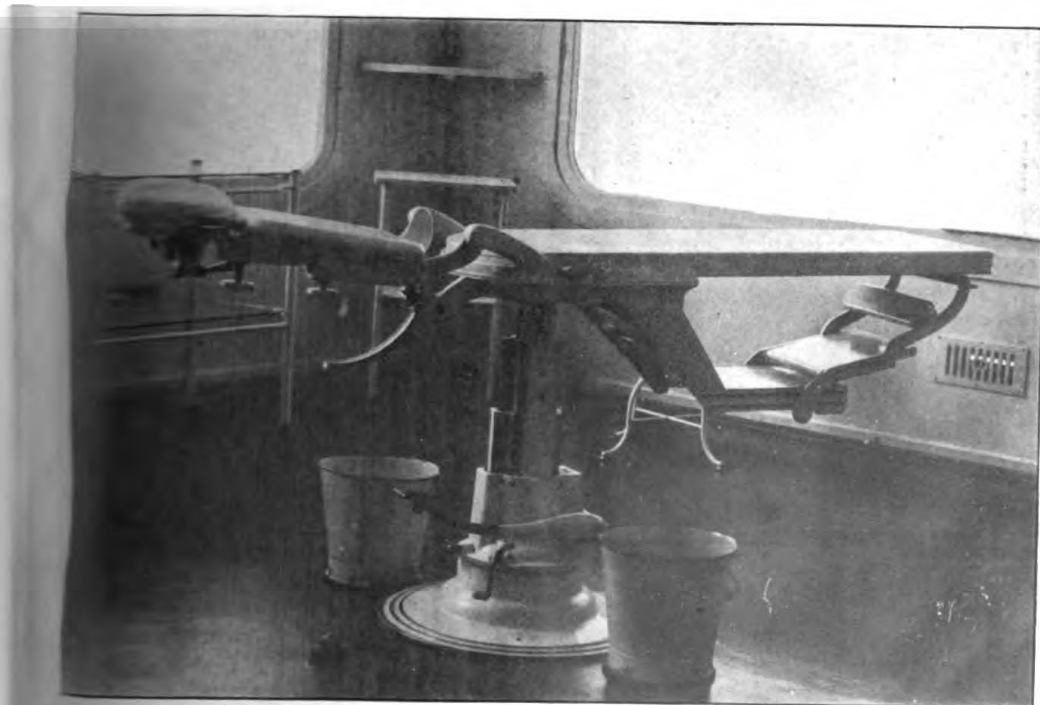
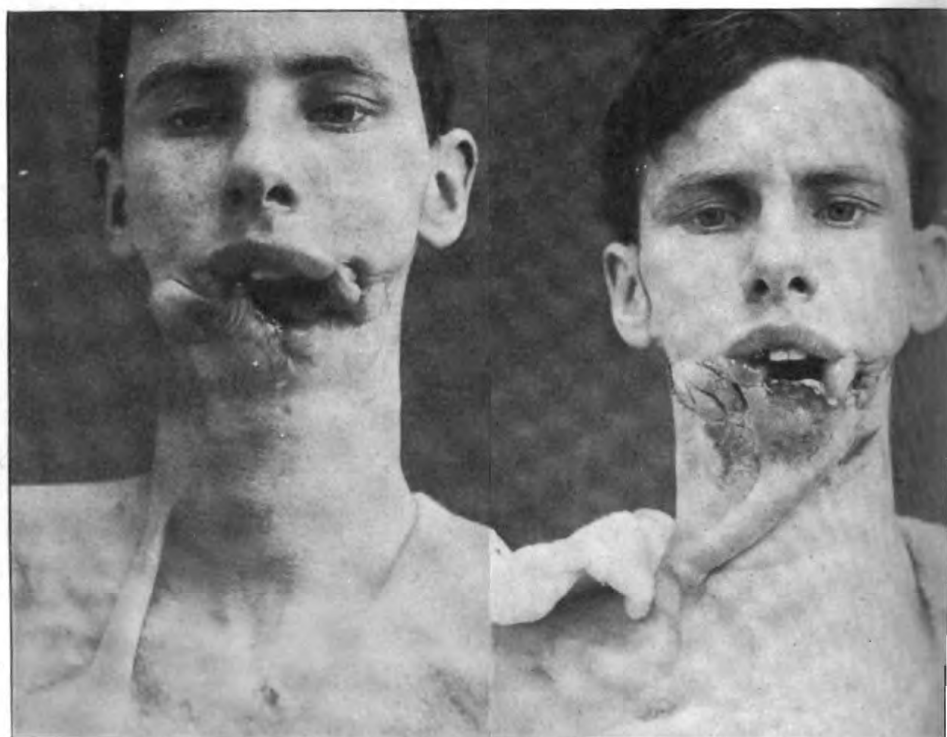


Fig. 13.—Dental chair used as operating table.

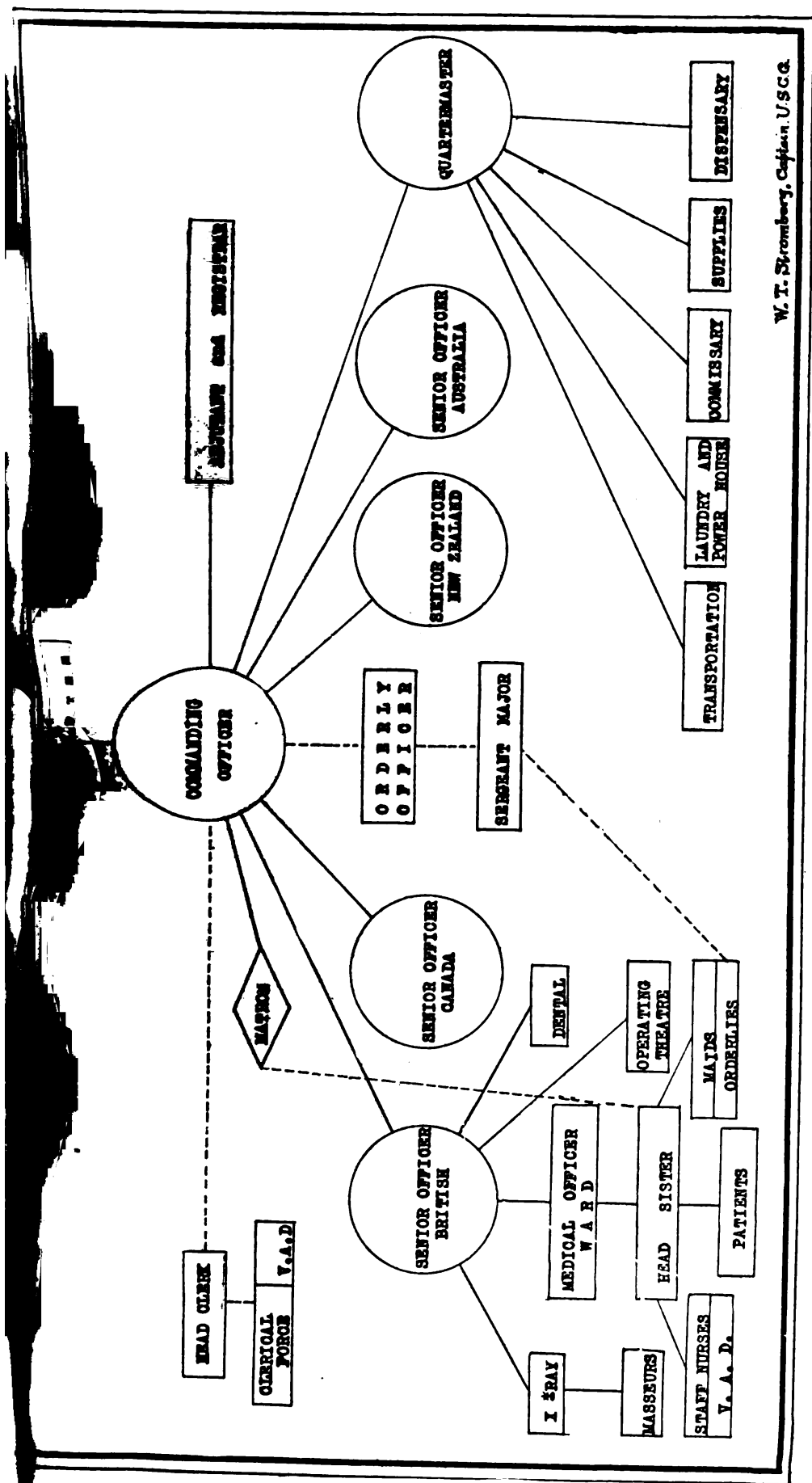
22-3



Fig. 15.—Dental mechanical laboratory.



Figs. 17-18.—Tubed flap used in repair of chin.



W. T. Stromberg, Captain, USCG.

Organization.

clerks, ambulance drivers, nurses, and laborers. The head clerk of the hospital is superintendent of the general service section. She has charge of all the clerical staff of the hospital, also of the discipline of members of the detachment. She gets \$600 a year and earns it. Head cooks get \$200 yearly, junior cooks \$75 to \$100, stenographers and typists \$135 to \$200. For those who reside at a distance a hostel is provided in Sidcup, where they can secure accommodations for \$3.50 a week, which is about equal to their pay; but the pay is not claimed to be any more than a nominal sum. Members of the labor section are paid \$140 to \$175 yearly; they are practically all local girls who live at home. The V. A. D.'s of the nursing section receive \$125 yearly. They are in charge of the matron and serve on probation for a month before being finally accepted. All the work of orderlies, scrubwomen, and nurses is done by these volunteer workers, among whom may be found girls from every social level.

The matron holds a position similar to that of chief nurse in our naval hospitals. She has charge of the discipline and detail of the sisters (the British trained nurse must always be called "sister") and the V. A. D.'s of the nursing section in all parts of the hospital. She also details the men of the R. A. M. C., who are turned over to her by the orderly officer. She also hires and discharges the maids.

Under the quartermaster are all matters relating to pay and supplies. All provisions, clothing, drugs, instruments, furniture, food, motor transportation, etc., are procured through and accounted for by this department. He is in charge of the ambulances, which are driven by V.A.D.'s; of the laundry and power house; of the commissary department, the food being prepared and served by V.A.D.'s; of the dispensary, the dispensers being V.A.D.'s, and having many other activities. A large part of the eggs and vegetables used at the hospital are raised on the hospital farm, on which the patients work. Most of the others are bought through the Army and Navy Canteen Board, a Government organization which makes purchases in enormous quantities and supplies all the military institutions, thus controlling the market and securing the most favorable prices. The cost of the ration averages about \$0.60, which is considered to be high because of the large number of soft, liquid, and tube feedings. The following is a typical weekly menu:

Diet sheet for patients, week ending Sunday, July 21, 1918.

	Breakfast.	Dinner.	Tea.	supper.
Monday, 15th.....	Tea, bread, butter, porridge, boiled eggs. TUBE DIET: Gruel, egg flip.	Boiled beef, cabbage, potatoes, fruit, and rice pudding. TUBE DIET: Potato soup, rice milk. FISH DIET: Fillets au gratin.	Tea, bread, marmalade.	Cocoa, bread, butter, pudding.
Tuesday, 16th.....	Tea, bread, butter, rolled oats, scrambled eggs. TUBE DIET: Gruel, egg flip.	Roast mutton, potatoes, savory bread pud- ding, chocolate blanc mange. TUBE DIET: Haricot soup, chocolate corn- flour. FISH DIET: Fried plaice.	Tea, bread, butter, jam.	Scotch broth, bread.
Wednesday, 17th...	Tea, bread, butter, porridge, fried bloaters. TUBE DIET: Gruel, egg flip.	Brown stew, vegetables, potatoes, sago cream. TUBE DIET: Tomato soup, sago cream. FISH DIET: Steamed cod.	Tea, bread, butter, scones and jam.	Cocoa, bread, butter, rice, and cheese.
Thursday, 18th.....	Tea, bread, butter, rolled oats, poached eggs on toast. TUBE DIET: Gruel, egg flip.	Roast beef, peas, potatoes, bread, and rhu- barb pudding. TUBE DIET: Gravy soup, barley milk. FISH DIET: Baked whiting.	Tea, bread, butter, sirup.	Cocoa, oatmeal scones.
Friday, 19th.....	Tea, bread, butter, porridge, bacon, and fried bread.	Fried fish, sauce, beans, potatoes, straw- berry blanc mange. TUBE DIET: sago soup, strawberry corn- flour.	Tea, bread, butter, jam.	Cocoa, bread, butter.
Saturday, 20th.....	Tea, bread, butter, rolled oats, fried eggs. TUBE DIET: Gruel, egg flip.	Roast beef, potatoes, vegetables (mixed), gooseberries and custard. TUBE DIET: Tomato soup, custard. FISH DIET: Fish cakes.	Tea, bread, butter....	Coffee, bread, butter, blanc mange.
Sunday, 21st.....	Tea, bread, butter, porridge, fish pie. TUBE DIET: Gruel, egg flip.	Boiled ham, peas pudding, potatoes, steamed currant pudding. TUBE DIET: Lentil soup, corn flour. FISH DIET: Fried fillets.	Tea, bread, butter, jam turnovers.	Cocoa, bread and but- ter, grated cheese.

The hospital is not entirely supported by the Government. In fact, I was informed that the war office pays only \$2,500 yearly for its maintenance. It is financed by public subscription and most of the beds are endowed. A committee of prominent persons is in charge and the directors general of the medical departments of the Army and Navy are presidents. The committee takes an active part in the policies and administration of the hospital and its auxiliaries. It manages the farm and charges the hospital the current market price for all produce furnished. It provides all clothing for the patients except the blue hospital clothing which is furnished by the ordnance department.

Recreation and amusement are important because of the tendency of the disfigured patients to become morose and despondent. The chaplain has charge of this as well as of the religious and educational work. There is a chapel for religious services and a large hall for cinema and other entertainments.

Certain of the forms used in the administration of the hospital are interesting. Figure 16 shows the form which accompanies a patient to the nose and throat department. The medical officer in charge of the case supplies the data at the bottom and the specialist after his examination and treatment, records them on the back and marks them on the outline figures. A similar form, but showing the mandible, maxilla, and teeth, is used for a patient referred to the department of oral surgery. The other attached forms correspond to those in use in our hospitals.

The British section, in which I worked, is commanded by Maj H. D. Gillies, who is really the father of the whole institution. The operators in the Australian, Canadian, and New Zealand sections were trained under him before taking charge of the independent work in their own sections. Much of the special technique of the hospital and many of the operative procedures described in Part II of this report originated with and were developed by him.

II.

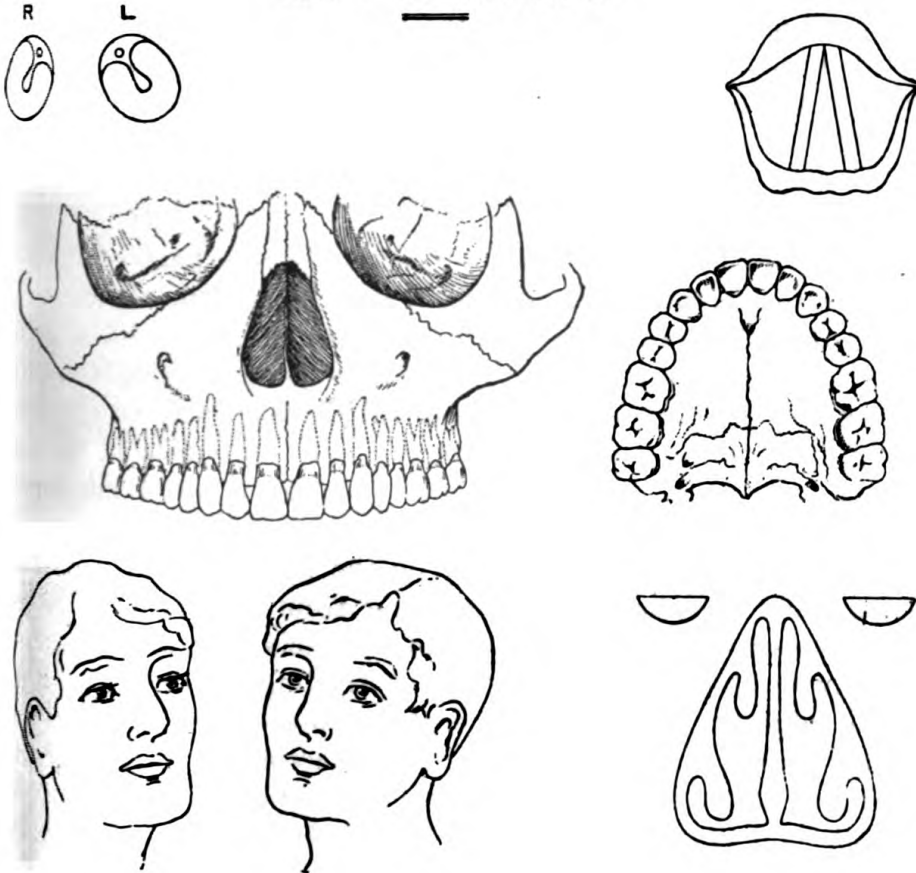
All men and officers of the Navy and Army suffering from facial and jaw injuries sufficiently serious to require expert and special surgery are now sent to this hospital. Some are received very soon after injury; others after the wound has healed and cicatricial contraction is complete; others after partial or attempted repair elsewhere. Many of these patients require operations in several stages which may cover a period of two years or more. I was impressed by the optimism of the patients, based on the wonderful improvement they saw produced in others whom they regarded as worse.

mutilated than themselves. There are now about 1,500 patients on the rolls of the hospital. As the bed capacity is only about one-third of this number it is necessary to send the patients on extended

QUEENS HOSPITAL, SIDCUP.

EAR, NOSE, THROAT DEPARTMENT.

SURGEON IN CHARGE—
CAPT G. S. HETT.



Patient's Name HUGHES Age 21
 Regiment & No. 35. Sqdn. R.A.F. Rank Lieut. Ward No. Off-2
 Cause of Injury } Crash Other Injury or Disease } Burns of face
 Date of Injury 2/2/15 Date when Patient came to Department } 1/3/18
 Date of Admission 4.6.18 Date of Discharge

FIG. 16.—Form used for patients referred to Nose and Throat Department.

furlough while they are waiting to be operated on or recuperating after operation.

When a patient arrives, photographs, X-rays, and plaster casts are made and, when indicated, dental examinations. All these data

are assembled with the patient, and the work to be done is outlined. Many of the cases require mechanical appliances and these are made in the dental mechanical laboratory.

I will try to describe some of the more common operations that I saw and assisted in during my tour of duty at the Queen's Hospital. Some of these procedures are old; some are modifications of old methods; some are new and original; but in all of them a wonderful perfection of technic has been developed as a result of the wealth of material supplied by the thousands of cases which have passed through the hospital. Maj. Gillies's book on plastic surgery, which is to appear shortly, will contain the essence of all that has been done at this hospital.

THE TUBED FLAP.

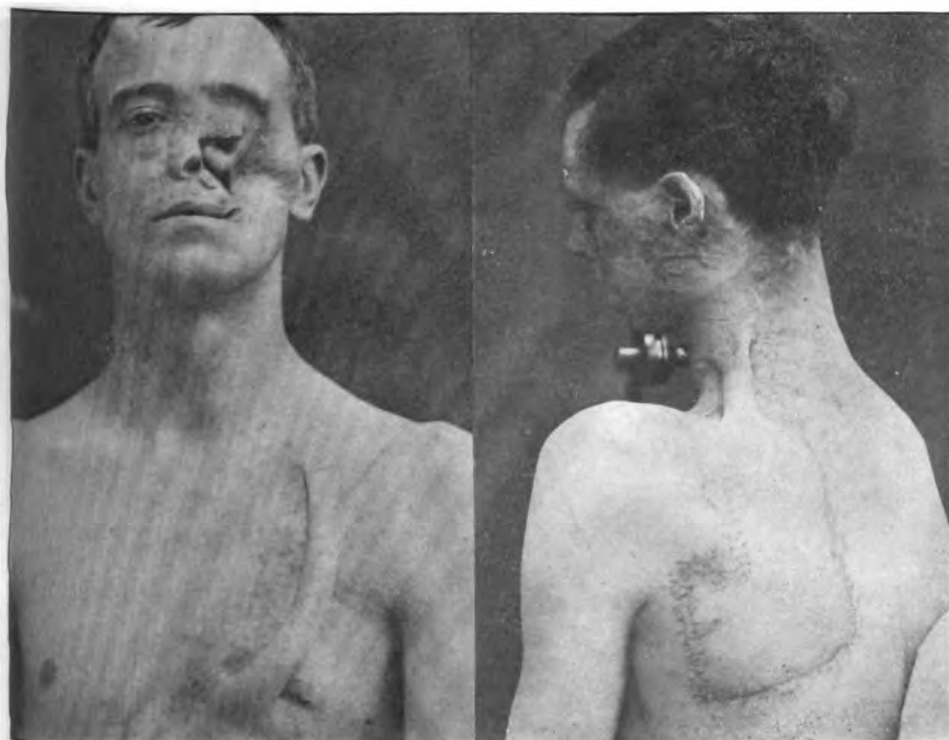
This device makes the skin of practically any part of the body available for repair work wherever it may be needed. It also makes certain that the transplanted skin will receive proper blood supply while its circulation in the new location is becoming established. It reduces the chance of infection since there are no raw areas exposed during the healing period. Gangrene and suppuration, the most common sources of failure in plastic surgery, are thus largely eliminated.

To produce a tubed flap for use on the face, make 2 parallel incisions about 2 inches apart, extending from the angle of the jaw down the chest or back. Cut down to the fascia and raise the strip of skin between the incisions, carefully controlling the bleeding. Bring the free edges of the strip together, to make a tube, and suture with horsehair. Undermine the edges of the adjacent skin, bring them together and suture, using tension sutures and buttons if necessary. At the lower end of the tube outline a flap of the desired size and shape and incise down to the fascia all the way around; tie all bleeding points and then close this incision with horsehair. The object of this is to cut off the blood supply from the adjacent skin and induce the formation of a greatly increased circulation through the tube. Healing will be complete in about 2 weeks and after this the outlined flap may be raised and removed to its new position, and there it will receive its blood supply through the tube until a new circulation is established. The condition of the new circulation may be determined at any time by pinching the tube, pressing on the flap and noting how rapidly the color returns after the pressure is released. When the flap is thoroughly healed, the tubed pedicle may be excised, returned to its former position or utilized as a flap in its turn, the old base now being the flap and receiving its blood supply from the part first transplanted.

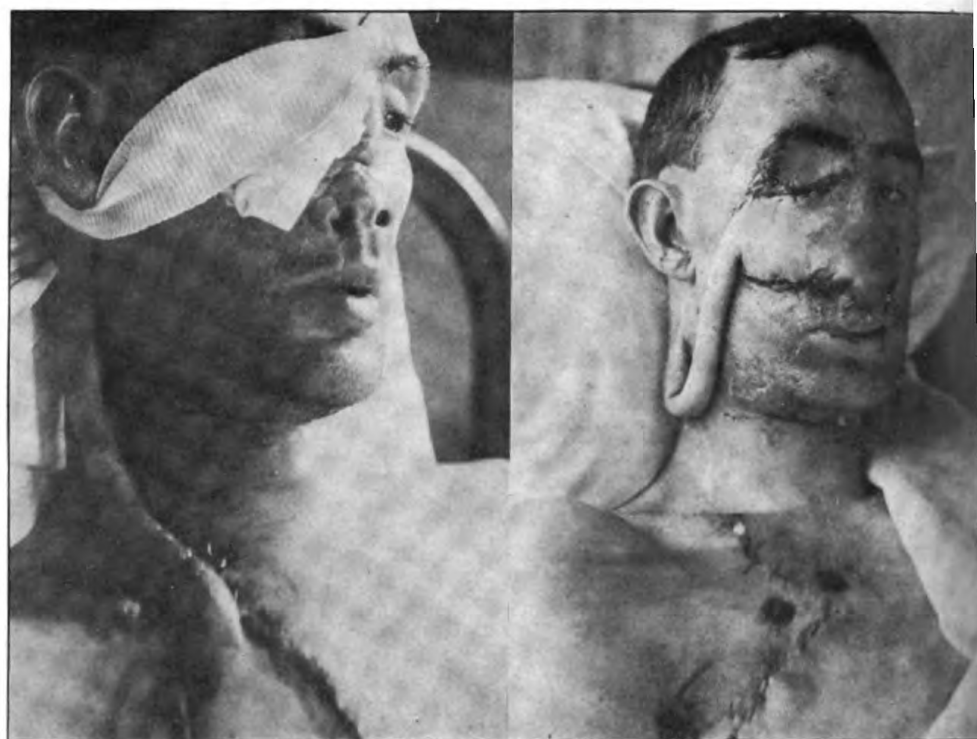


Fig. 19.—Tubed flap from forehead for repair of nose.

Fig. 20.—Tubed flap from chest for repair of chin.



Figs. 21-22.—Tubed flaps prepared on breast and back for repair of face.



Figs. 23-24.—Tubed flap from chest for repair of face.



Figs. 25-26.—Aviator's burn. Cicatricial contraction and ectropion.

The caterpillar flap is a modified tube flap used when it is desired to bring skin from a distant part. The tube is prepared as before, wherever the desired skin may be. After healing is complete the distal end is freed and brought up close to the proximal end, where it is reattached. When healing is complete the process is repeated, moving the ends alternately until the transplanted skin arrives at its destination. The movement of the tube is similar to that of a caterpillar, and it can be moved 5 or 6 inches at each step. The operations can be done under local anesthesia if desired.

The illustrations show some of the many uses of the tubed flap. Figure 17 shows a tube prepared for use in reconstruction of a chin and lower lip. The flap after being transplanted is shown in figure 18. Figure 19 shows a tubed flap from the forehead brought down for repair of a defect of the nose. In figure 20 a tubed flap has been brought from the chest to replace scar tissue in a typical aviator's burn. The pedicle was later used for further replacement. Figure 21 shows a large tube prepared on the chest for transfer to the face and also redundant tissue from the upper lid tubed ready for use in forming a lower lid. Figure 22 shows a large flap outlined on the back and with pedicle tubed ready for transfer to the face to replace scar tissue resulting from an aviator's burn. In figures 23 and 24 a tube has been made and a flap taken from the chest for repair of the cheek, lower lid, and nose.

EYELIDS AND EYE SOCKETS.

Repair of eyelids and eye sockets is required in many cases. These may be divided into two classes: (A) Those in which there is no loss of tissue, only cicatricial contraction; (B) those with loss of tissue.

Class A is composed mostly of burns, such as the gasoline burns of aviators who have come down in flames, or cordite burns. These are usually burns of the third degree involving the whole exposed portion of the face, followed by scarring and contraction, producing such excessive ectropion that it is not possible to close the eye to protect it from wind and dust. This results in chronic inflammation, and the eye itself is endangered, so that early operation to restore the function of the lids is necessary.

Class B includes cases where there is loss of the soft tissues or the bone forming the orbit. In these cases the eye has usually been enucleated before the patient reaches the plastic surgeon, and the problem is to make a socket which will hold a glass eye.

The Queen's Hospital had many cases of ectropion due to cicatricial contraction following burns. Most of them were aviators, but a number were men of the Navy who had been burned in explosions on

board ship, some in the Jutland battle. Such injuries will occur in our Navy from time to time, as they have in the past; therefore a simple operation which gives assurance of functional restoration of the eyelids should be of value to our service.

The muscular tissue of the eyelids is usually found to be uninjured and the mucous membrane will become normal when it is restored to its normal position, so the problem is to correct the ectropion. For these cases Maj. Gillies uses a modification of the method originated by Esser, which he calls the epithelial inlay when applied to a mucous surface and the epithelial outlay when applied to a skin surface. The usual operation for cure of ectropion by epithelial outlay is as follows:

An incision is made through the skin just above and parallel to the lid margin, extending the whole width of the lid. The skin of the lid is then separated from the underlying tissues until the lid margin can be brought to its normal position. This leaves a raw area between the skin and the lid margin which must be covered with skin. Dental modeling composition is softened in boiling water and a piece molded so that when it is placed on the raw area the skin edges can be brought together over it. This mold usually resembles a date stone in size and shape. A Thiersch graft is cut from the upper arm and wrapped around the mold with the outer skin surface inward. The skin-covered mold is now placed in position and held by retention sutures while the skin incision is carefully closed with horsehair. In making each stitch the needle should pass through skin margin, skin of graft, and then through skin margin, bringing the cut edges of the skin against the graft. When the operation is completed the patient looks about the same as before operation but an epithelial-lined pocket is being formed that when flattened out will restore the lid to its normal position. All four eyelids may be operated on at once if desired. After eight or nine days, if the mold has not come out, remove it by reopening the original incision and the lid will resume its normal place. The new skin is usually found to be in excess but it soon becomes smoothed out and the result is a good functional lid with soft flexible skin.

Case 1 is a gunner who suffered a severe cordite burn of the face. Figures 25 and 26 show the typical appearance of such a case after healing is complete, with hard ivorylike keloidal scar over the entire exposed area of the face and marked ectropion of the eyelids. Figures 27 and 28 show the same man with eyes opened and with them closed. Note the excessive effort required to bring the lids together, the extreme eversion of the lids and the inflamed condition of the conjunctiva. Figure 29 shows the right eye one month after epithelial outlay operation on both lids. The functional result is



Fig. 27.—Ectropion. Eyes open.



Fig. 28.—Ectropion. Eyes closed.

30-1

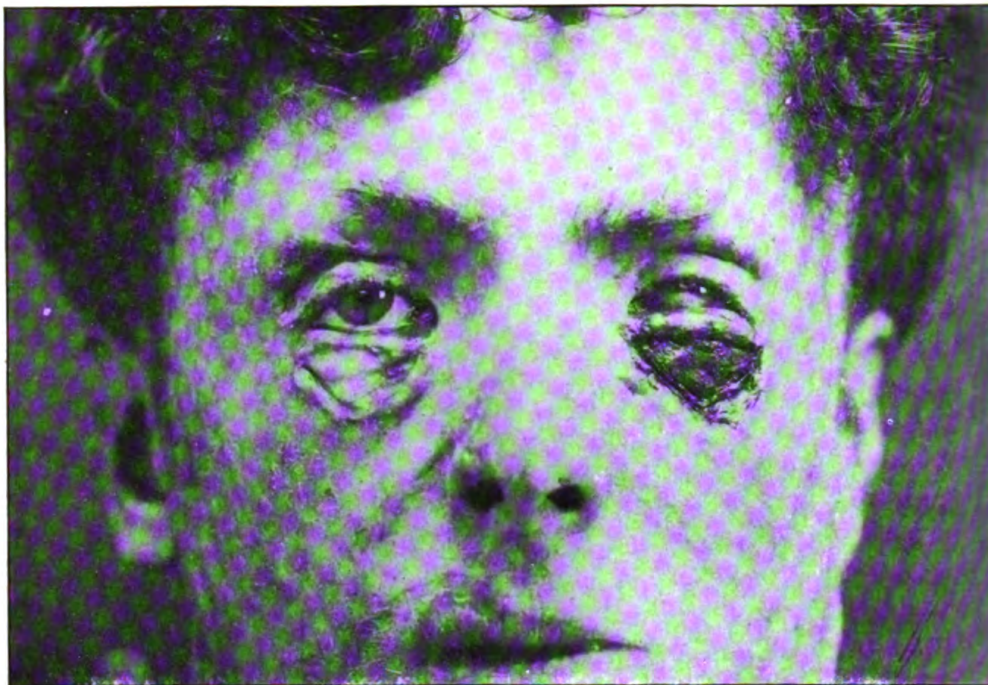


Fig. 29.—Epithelial outlay repair of eyelids; autogenous on right, heterogenous on left.



Fig. 30.—Epithelial outlay. Eye open.



Fig. 31.—Epithelial outlay. Eye closed.

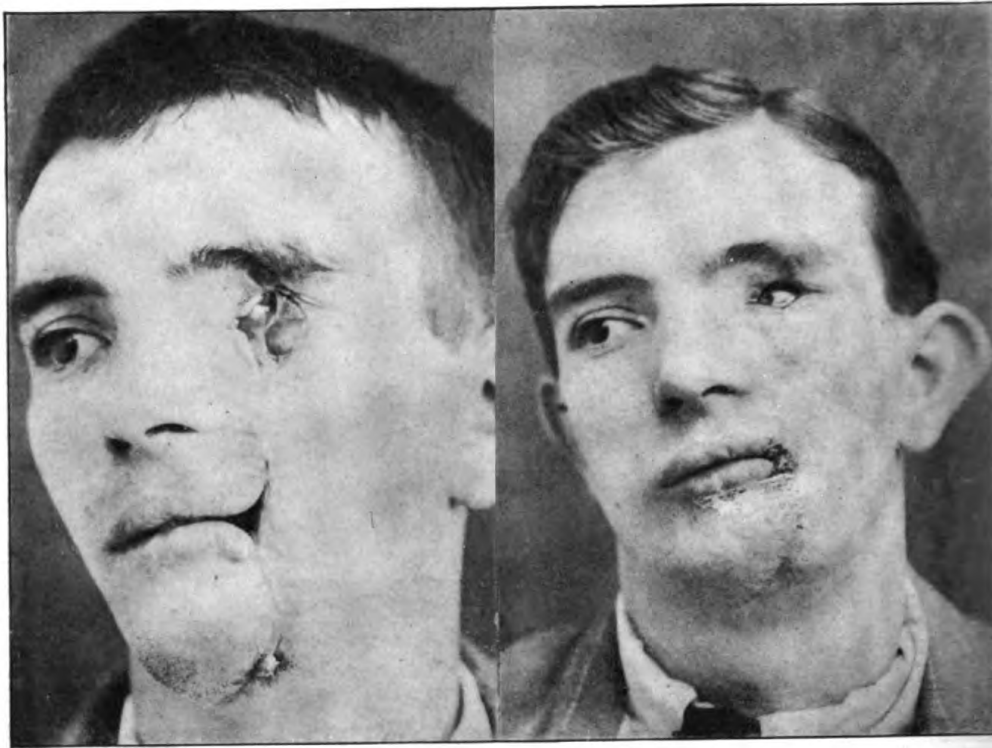


Fig. 32.—Aviator's burn. Cicatricial contraction and ectropion.



Fig. 33.—Repair of eyelids by epithelial outlay.

31-3



Figs. 34-35.—Plastic repair of eyelid and cheek.

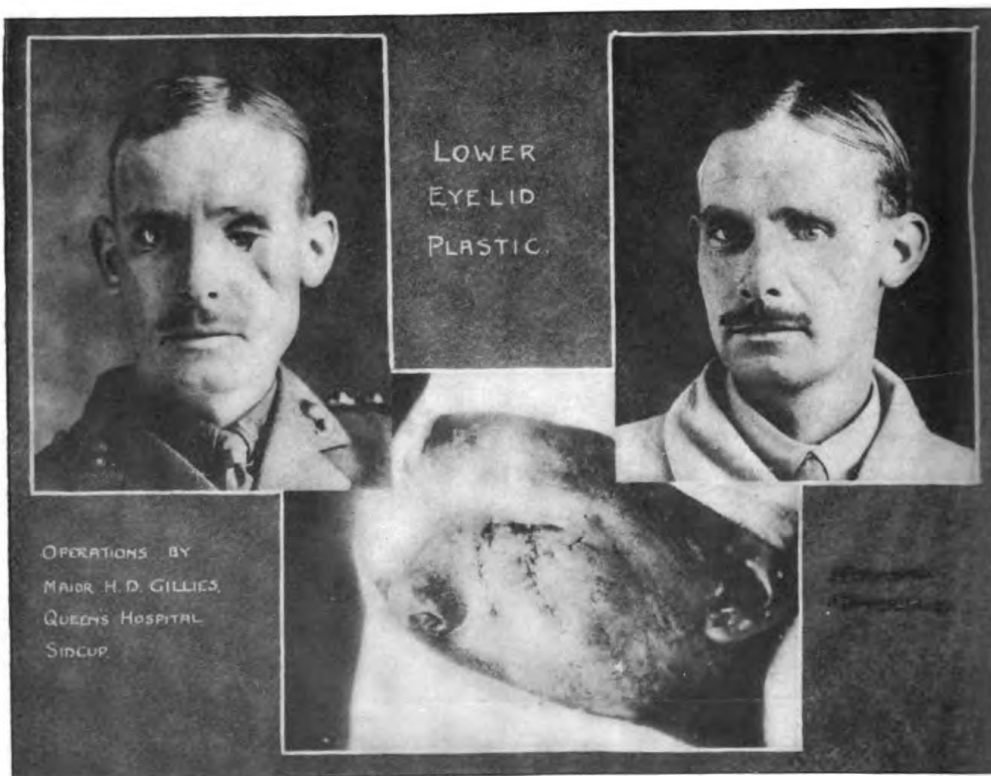


Fig. 37.—Plastic repair of eye socket and cheek.

perfect but the new skin has not yet become smooth. The left eye shows an interesting condition; 12 days before this picture was taken an epithelial outlay operation was done on the lower lid, using the skin of another man. The graft did not live. Some weeks later the operation was repeated, using the patient's own skin, and was entirely successful. Figures 30 and 31 show the right eye open and closed after operation.

Case 2, an aviator, is similar to case 1. Figure 32 shows the condition before and figure 33 after epithelial outlay operation on both lids of the right eye, the latter having been taken before healing was complete. Figure 20 shows the same patient in a more advanced stage, and it will be noticed here that there is still some ectropion of the lower lid, the graft having been too small.

It is unfortunate that photographs can not show the contrast between the soft, flexible skin of the grafted area and the hard, white, scar tissue surrounding it. Both the cases shown above were in an intermediate stage, as later operations were done to provide new noses and to replace the scar tissue over the whole faces.

Cases coming under class B, with loss of tissue, show a wide variation in type depending on the amount and kind of tissue lost and the distortion caused by scarring. It may be found necessary to replace bone, skin, mucous membrane, and fat. Rib cartilage is usually employed to replace bone, and flaps from the cheek or forehead to restore the eyelids. Figures 21, 23, and 24 show how a flap from the chest may be used for repair of large defects in this region.

Case 3, a gunner, was wounded by a bullet which entered the left supraorbital region, destroyed the eye, divided the upper and lower lids, furrowed the cheek, cut the angle of the mouth, and fractured the mandible. At operation the lower lid was freed from the scar and the parts brought together. The scar was removed down to the angle of the mouth and a flap turned up from the cheek to raise the lower eyelid. At a later operation an epithelial outlay was placed in the upper lid and a full-thickness free graft from the upper arm was used to raise the lower lid still more. Figures 34 and 35 show the condition before and after these operations. The glass eye worn in the latter picture does not fit properly, a suitable eye was later fitted and greatly improved the appearance.

Figure 36 shows diagrammatically the steps taken to provide an eye socket after loss of most of the lower lid and a portion of the orbit. The flaps C and D, consisting of skin and mucous membrane, were lifted, trimmed to shape, and sewed together. The flaps A and B were then freed and transposed so as to raise the lower lid. At a later operation, cartilage from a rib was inserted under the skin to replace the missing portions of the bony wall of the orbit and malar eminence.

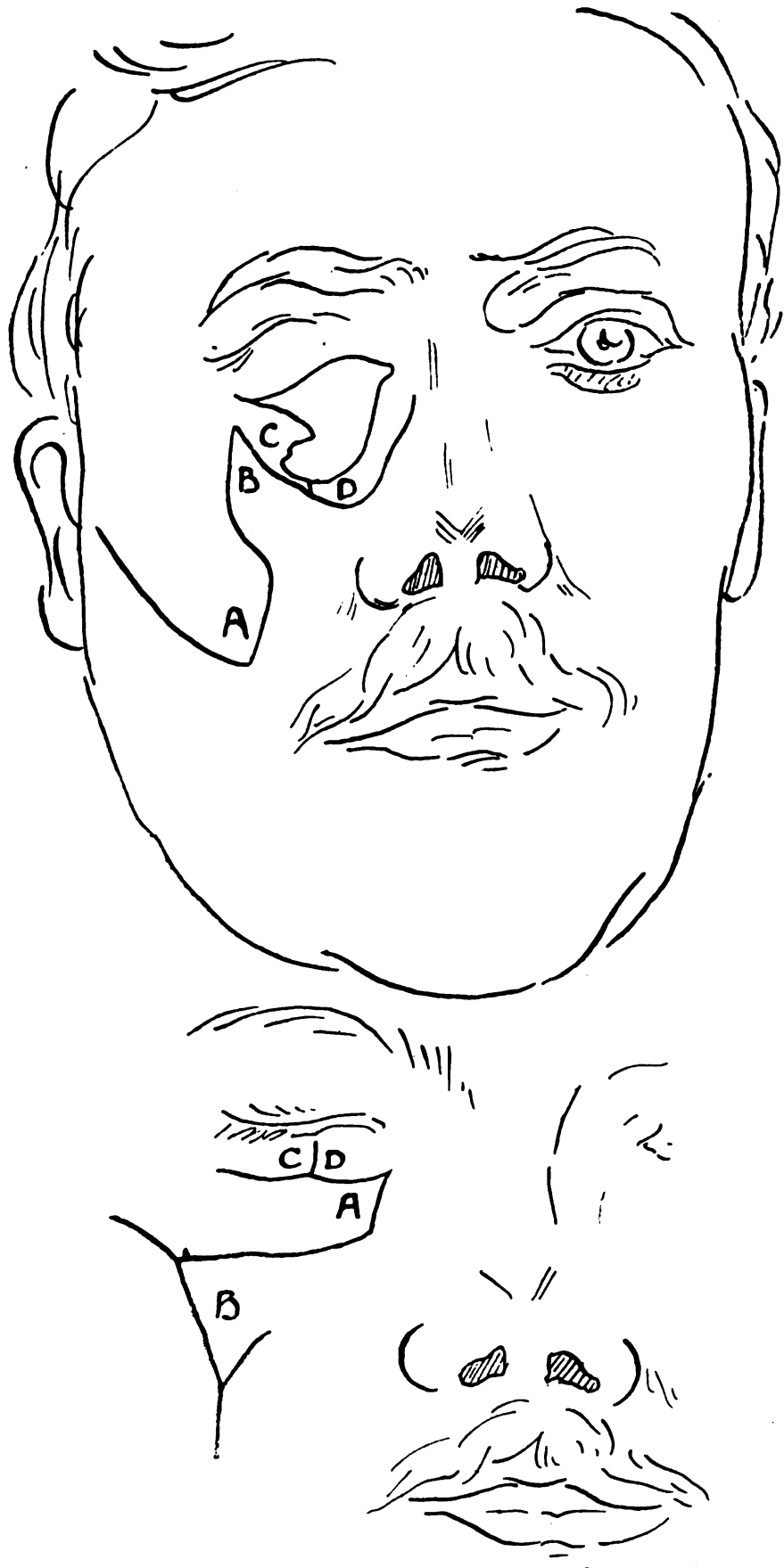


FIG. 36.—Plastic repair of eye socket.

Figure 37 shows a similar case involving the left cheek and lower lid. It was necessary to excise the scar and then to employ flaps as shown in the lowest of the three views. The picture at the right shows the condition after restoration of the eye socket and insertion of a glass eye. It is important to remember that new eyelids must be covered with epithelium on the inside as well as on the outside, and eye sockets to hold glass eyes must be lined with epithelium throughout. Epithelial inlays within the eye socket are frequently necessary.

RHINOPLASTY.

Severe disfigurements of the nose are most humiliating and no other class of patients is more desirous of operation or more appreciative of improvement in their appearance. Cases seen at the Queen's Hospital vary from those requiring simple scar excision to those having no vestige of nose, in whom a complete new organ must be constructed. The cases between these extremes present many problems and no two are alike, but all completed noses must have an airway; must be supported by bone or cartilage and must be covered with epithelium on the inside as well as on the outside. Methods of rhinoplasty are continually changing as complicated and unsatisfactory methods are being supplanted by simpler and better ones.

A complete rhinoplasty is usually done in several stages, several weeks elapsing between them. In one case, which may be regarded as typical of a large group, the procedure was as follows: A plaster cast was made and on this a suitable nose was modeled in clay. The size and shape of the cartilage required was determined. Flaps to be turned in to form the epithelial lining and one to be turned down from the forehead for outside covering were outlined on the cast, using patterns of heavy tinfoil to show the size and shape. At the first operation a large piece of cartilage was removed from one of the lower ribs with the special technic usual to bone surgery. A piece of this was cut to the size and shape previously determined for the nose cartilage. The remaining cartilage was slipped under the skin of the abdomen, through a small incision, to act as a larder in case more cartilage should be required at any time. The piece which had been cut to shape was then inserted under the skin of the forehead, through a small incision, in such a position that when the flap was turned down it would come to its proper place. The incisions were then carefully closed with horsehair. About a month later, after the transplanted cartilage was well established and it was evident that there would be no necrosis or infection, the second stage was undertaken. The flap previously planned on the cast was cut and turned in to make the lining of the nose, the large forehead

flap was turned down to form the outside integument. All suture lines were carefully closed with horsehair; buried sutures were of fine catgut. The skin of the scalp was then undermined and drawn forward to cover the raw area on the forehead. The portion that could not be covered in this way was closed with a full-thickness free graft from the arm. After about a month, when all the tissues were well healed, the third stage was done. This consisted of returning to the forehead the pedicle of the large flap and shaping the bridge of the nose, the alae and the columella.

During the earlier stages of the development of this operation it was customary to swing out a portion of the septum, turbinate, or perpendicular plate of the ethmoid to act as support for the nose. This has largely been supplanted by the operation just described, but when it is necessary to close a hole in the antrum, orbit or frontal sinus these bones may be utilized for the purpose. The final shaping of the bridge and alae may be done under local anesthesia if desired and the type of nose may be altered to suit the patient's wishes. Frequently a patient is so delighted with the result of the operation that he refuses to allow the final finishing touches that the operator thinks necessary. Some of the illustrations are of noses that pleased the patient more than they did the operator. All the rhinoplasties that I saw produced good functional noses, which did not run or turn blue in cold weather. The scars of operation frequently disappear entirely within six months or less.

The accompanying illustrations show some of the problems of rhinoplasty and the methods of repair. Figures 38, 39, and 40 are diagrams of a case in which most of the right ala was missing and there was a hole through the right side of the nose. Flaps A and B were raised, leaving them attached along the borders of the small opening, and turned in to close the hole and provide a skin lining. Flaps C and E were similarly turned in to close the lower and larger hole, producing the condition shown in figure 39. Flap D was then brought down and sutured in place over the raw area, as in figure 40. A full-thickness free graft from the arm was employed to fill the gap in the forehead.

Figure 41 shows a case in which there was loss of the bridge of the nose, with deformity from cicatricial contraction and lack of support for the alae. The columella and alae were still available for use in reconstruction. It is important to save as much as possible of these structures, since they are most difficult to reproduce. At the first operation the scar tissue was removed, the alae freed from adhesions, and cartilage inserted under the skin in the position shown by the stippled area in the illustration. At the second operation the flap containing the cartilage was turned down; flaps A and B from the

cheeks were turned in and sutured to it and to the alae below, thus lining the nose and providing support for it. The frontal flap was then turned down to cover the nose. The raw areas in the cheek were covered by undermining and stretching the adjacent skin and the raw area in the forehead was covered in the usual manner.

Figure 42 shows a case in which the upper part of the nose was lost together with the anterior wall of the frontal sinus and a part



Fig. 38.—Rhinoplasty. Flaps A and B turned in to close small hole; C and E to close larger hole.

of the orbit. It was necessary to construct a socket for a glass eye as well as to repair the nose. The semicircular flap A was rotated up to make the lower lid. The flap B was turned up to provide an epithelial lining for the upper part of the nose and frontal sinus while the frontal flap C was brought down to cover the raw area over the bridge of the nose. Later an epithelial inlay was necessary to complete the eye socket, and cartilage was inserted to support the bridge of the nose.

Figure 43 shows diagrammatically a case in which there was loss of the tip of the nose, the alae and columella. The remains of the alae (*b, b*) and of the columella (*c*) were freed from their adhesions. The flaps (*a, a*) were turned down and sutured to *b, b* and to *c* to form a skin-lined airway. The forehead flap (*d*) was turned down to cover the raw area. The method of returning the pedicle and shaping the bridge of the nose is shown in the lower drawing.

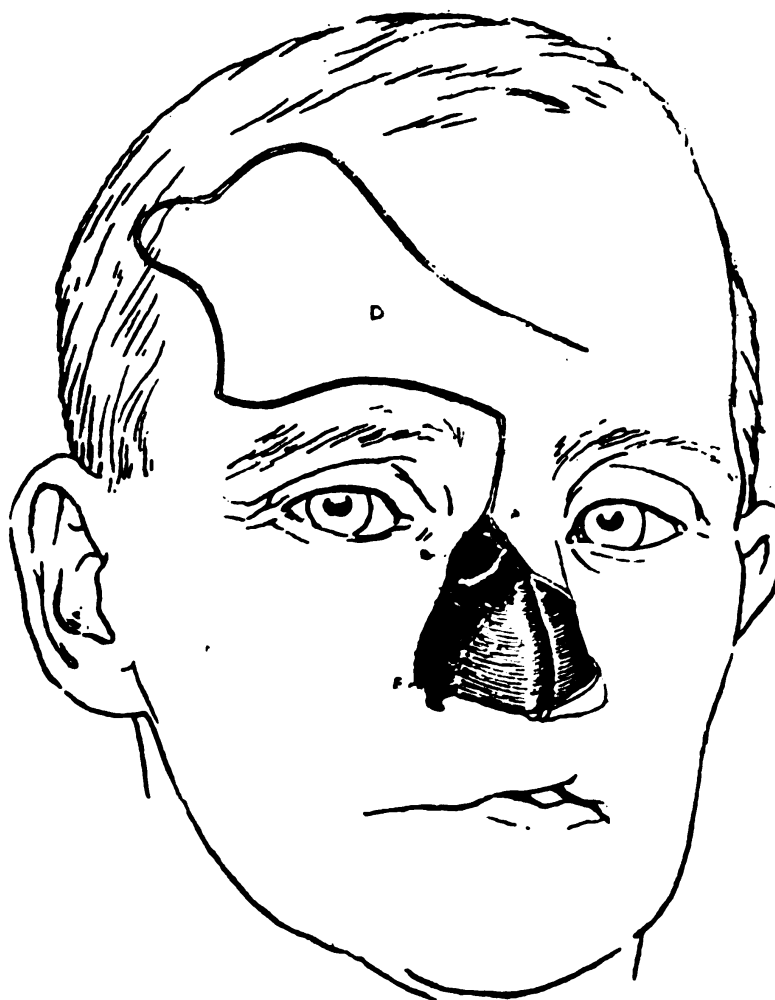


FIG. 39.—Rhinoplasty. Flaps turned in to close holes. Forehead flap outlined.

Figures 44 to 47 show several rhinoplasties of various types before and after operation.

Figures 48 and 49 show a returned prisoner of war with a nose made in Germany. This probably represents an intermediate stage of a rhinoplasty, the pendant mass being composed of tissue from the cheek rolled around a piece of rib. A satisfactory nose was made for this man in the usual manner. Another nose made in Germany is shown in figures 50 and 51. The roll of tissue was taken from the forehead. Because the scar from this operation was

so placed that it made the blood supply of forehead flap too uncertain an effort was made to utilize this mass of tissue, with the result shown in figures 52 and 53. The appearance was greatly improved by later corrective operation, but was, on the whole, unsatisfactory. These patients said that the completed noses they saw made in Germany were not much more shapely than those they brought back with them.

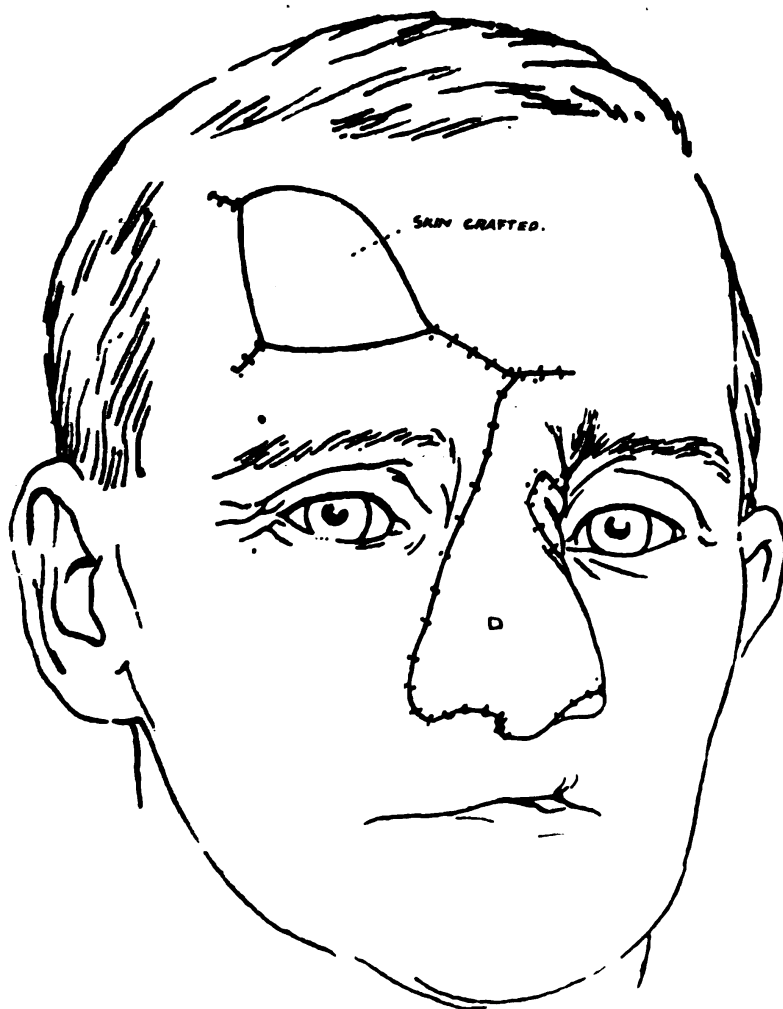
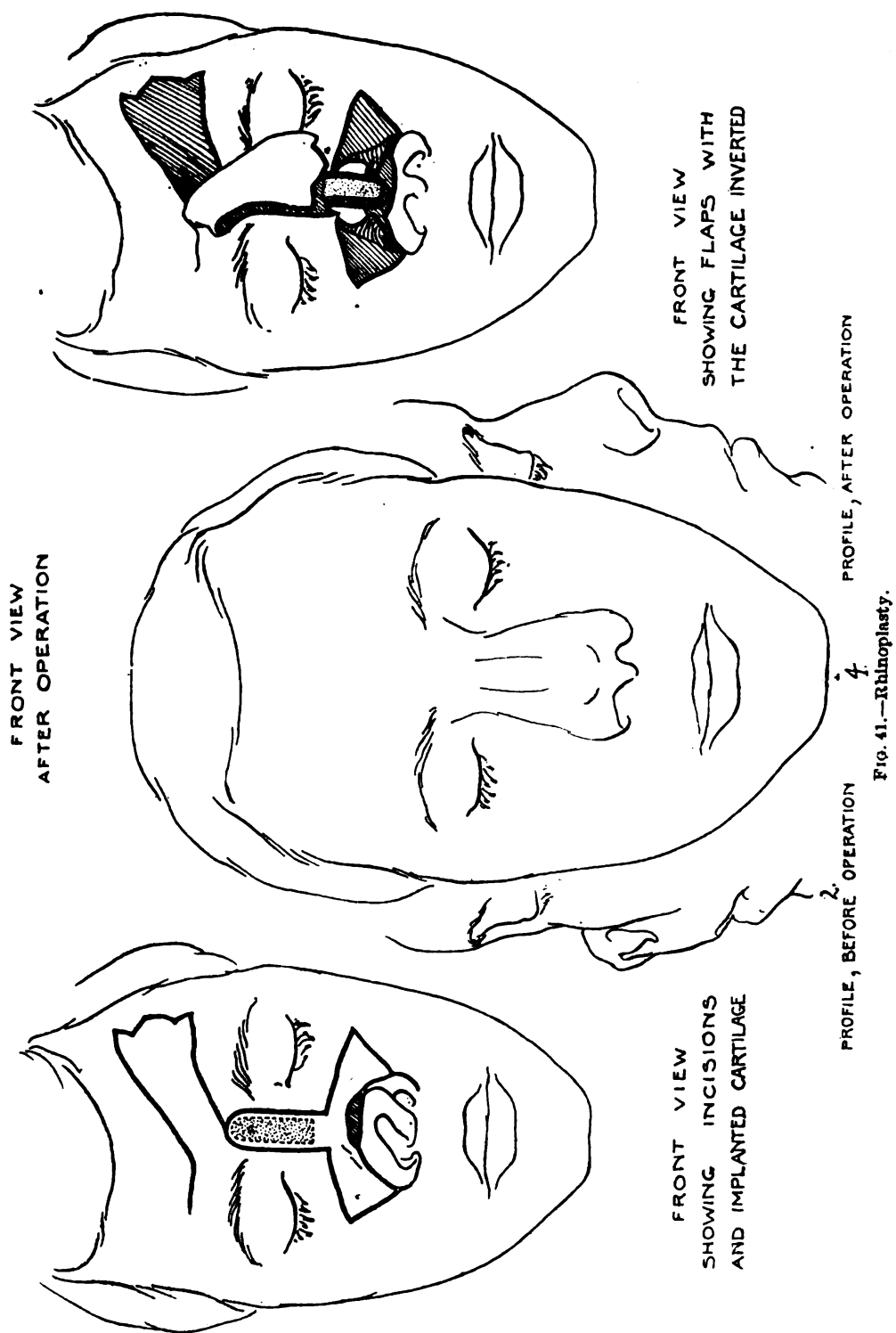
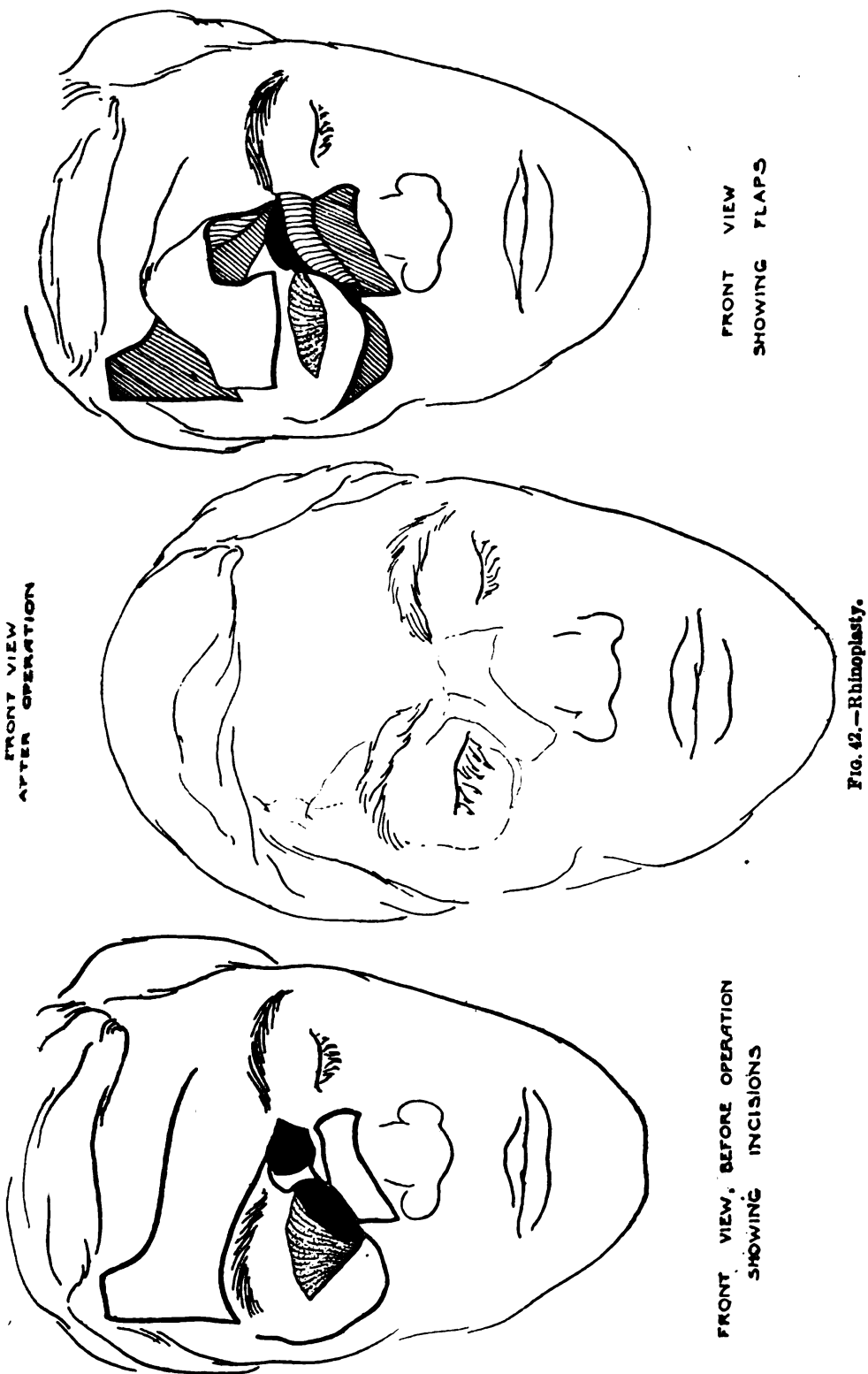


FIG. 40.—Rhinoplasty. Forehead flap brought down.

The case illustrated by figures 54 to 62 was a most interesting and successful one. The tip of the nose was drawn up and the bridge depressed. There was a perforation into the left antrum with persistent suppuration and discharge through the opening, which demanded operation.

Figures 56 and 57 illustrate the use of the plaster cast in planning and recording the operative work. At the first operation a piece of cartilage was inserted under the skin of the bridge of the nose as shown by the stippled area in figure 58. All scar tissue was ex-





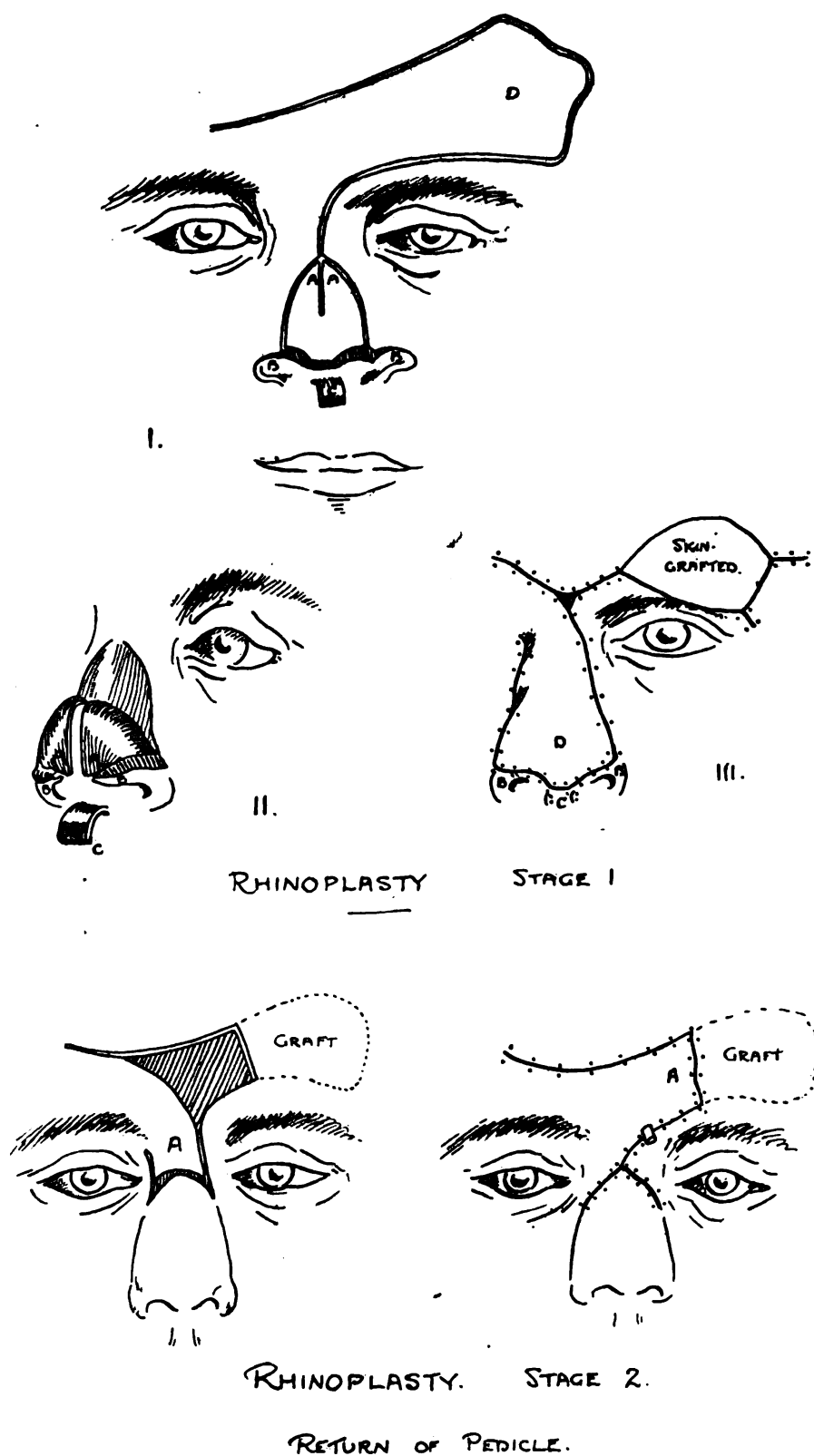


FIG. 43.



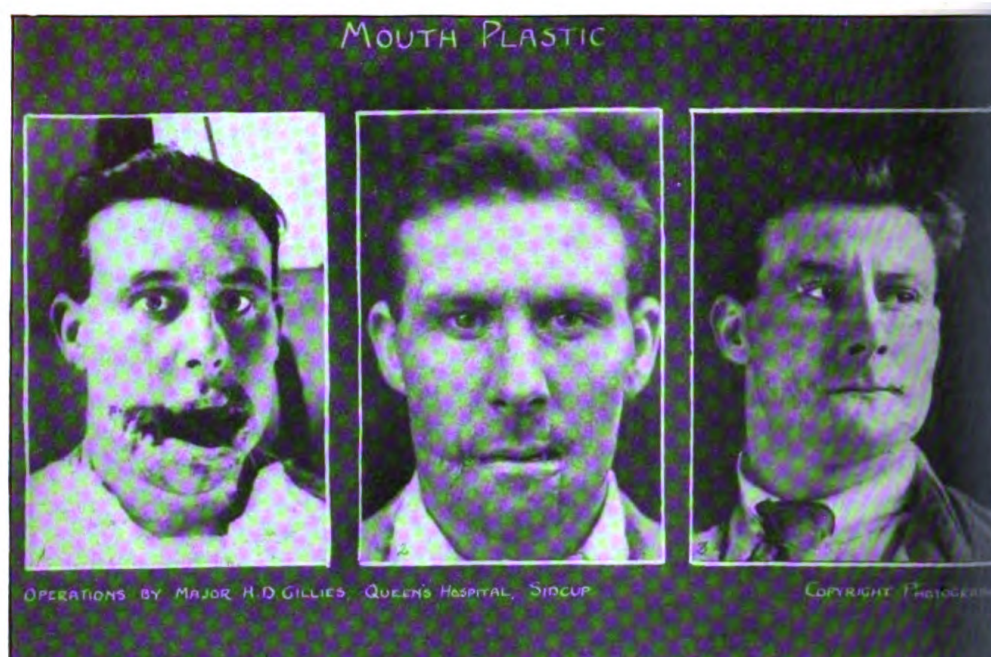


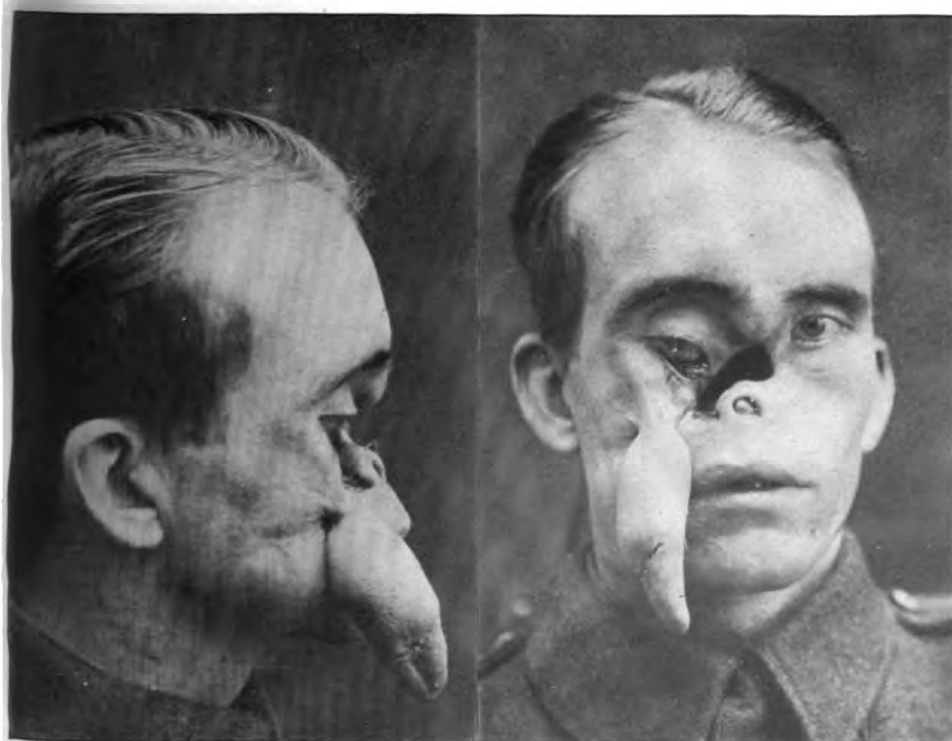
Fig. 45.—Rhinoplasty.



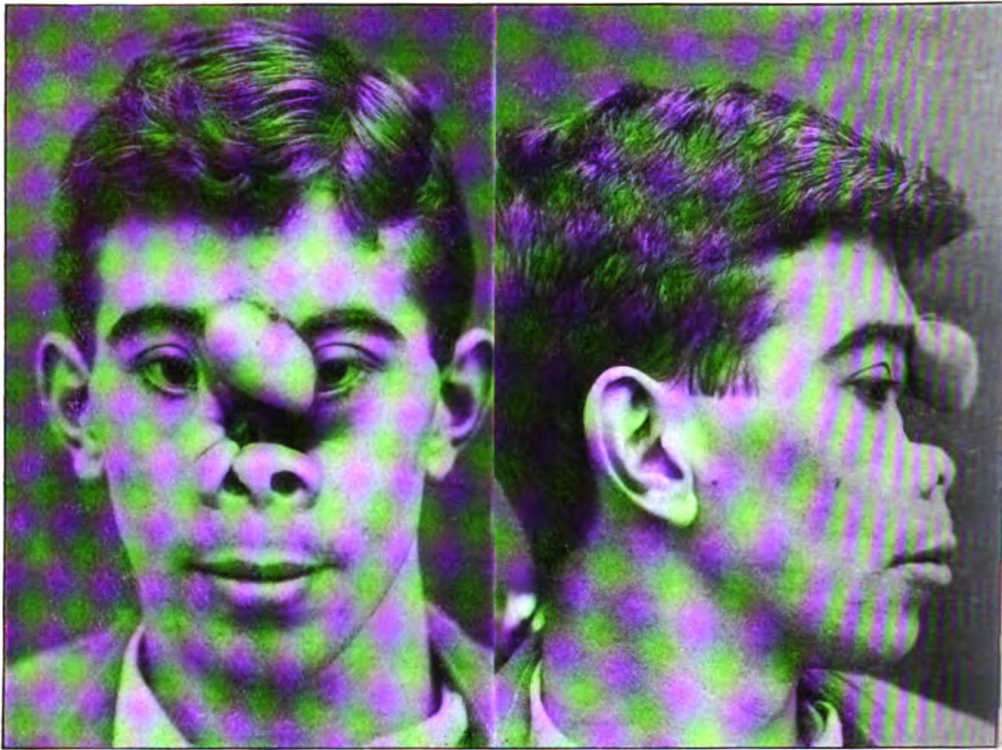
Fig. 46.—Rhinoplasty.



Fig. 47.—Rhinoplasty.



Figs. 48-49.—A nose made in Germany.

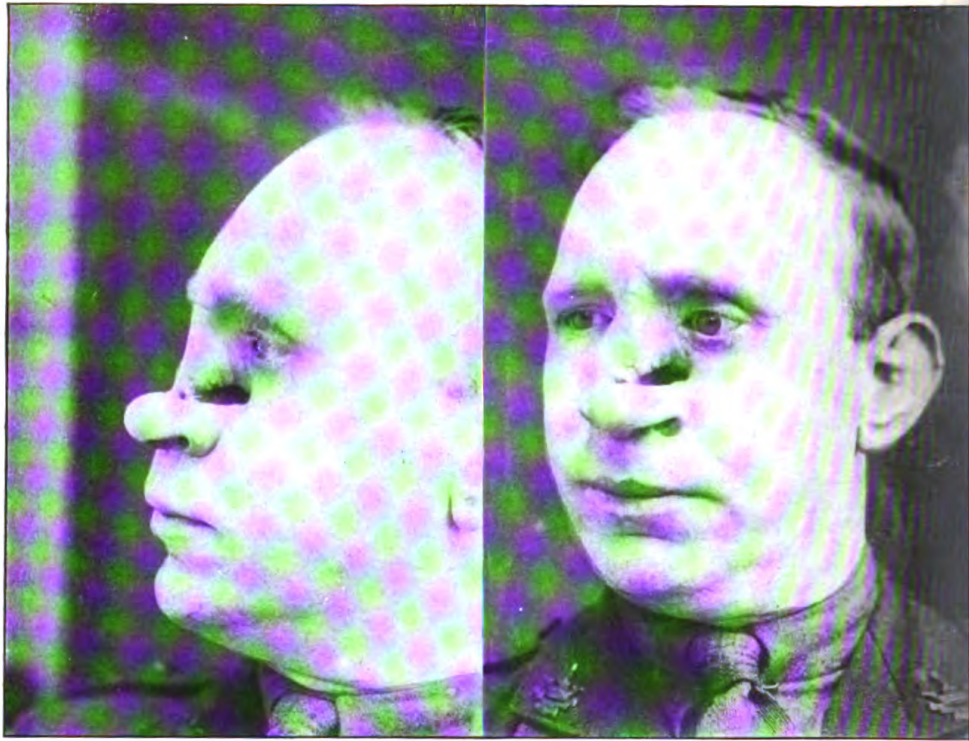


Figs. 50-51.—A nose made in Germany.

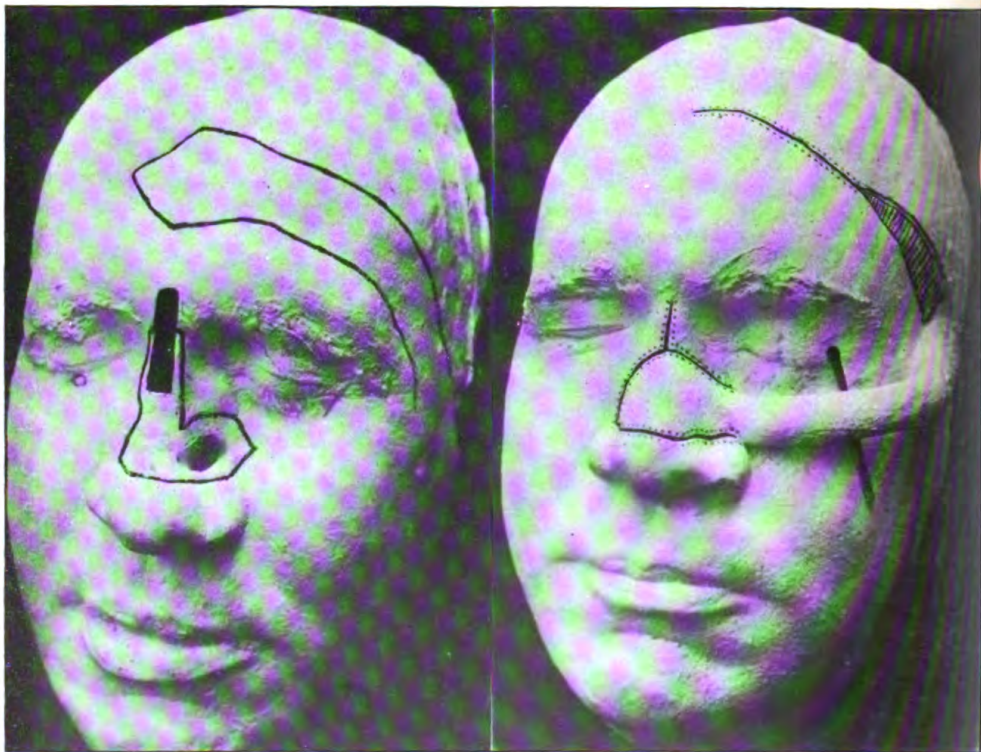


Figs. 52-53.—Repair of "nose made in Germany."

40-4



Figs. 54-55.—Rhinoplasty. Before operation.



Figs. 56-57.—Rhinoplasty. Use of plaster casts to plan and record work.

cised, skin was sewn to mucous membrane around the opening in the nose and an airway was established. At the second operation (fig. 59) a flap was turned down and sutured to the tip; this flap contained the implanted cartilage. Flaps above and below the opening in the left ala were turned in to close the opening. A forehead flap to cover the raw area was cut with its base at the temporal artery. The pedicle was tubed and the flap sewed into position as



FIG. 58.—Rhinoplasty. Cartilage inserted under skin; flaps outlined.

shown in figure 60. The condition when healing was nearly complete and before the pedicle was removed is shown in figure 61. Later a part of the pedicle was returned to its original position and another portion was used to replace a scar in the left cheek (fig. 62). When I last saw this patient all the scars had disappeared and there was no evidence of injury or operation.

The patient next shown had suffered the loss of the lower half of the nose while the nasal bone remained intact (figs. 63 and 64). At

the first operation a piece of cartilage was embedded under the skin at the bridge of the nose; all scar tissue was removed; both alae were separated from the septum; skin was sutured to mucous membrane at the edges of the opening, thus establishing an airway (fig. 65). At the second operation, figures 66, 67, and 68, a flap was taken from the glabellar region including the implanted cartilage, turned down and sutured to the remains of the alae. A flap from the septum was swung down to help support the columella. A forehead



FIG. 59.—Rhinoplasty. Flaps turned in to close hole. Flap with cartilage turned down. Forehead flap cut.

flap was used to cover the raw area. The lobule and columella were made by bringing together the two lateral flaps (fig. 67 *c, c*). The remains of the alae were sutured to the outer pair of lateral flaps (fig. 67 *a, b*), the ends of which were turned in upon themselves to complete the skin lining. After healing was complete and before the pedicle was returned the appearance was as shown in figures 69 and 70. Later the pedicle was returned; the scar tissue from the former operation was excised from the forehead and a full-thickness

free graft applied to the raw area to restore the hair line to its normal position (figs. 71 and 72).

Figure 73 shows a somewhat similar case with loss of the columella. The upper views were taken before and the lower after operation.

LIP AND CHIN PLASTICS.

Wounds requiring plastic surgery of the lips are seen by the hundred at the Queen's Hospital. Many of them are complicated by

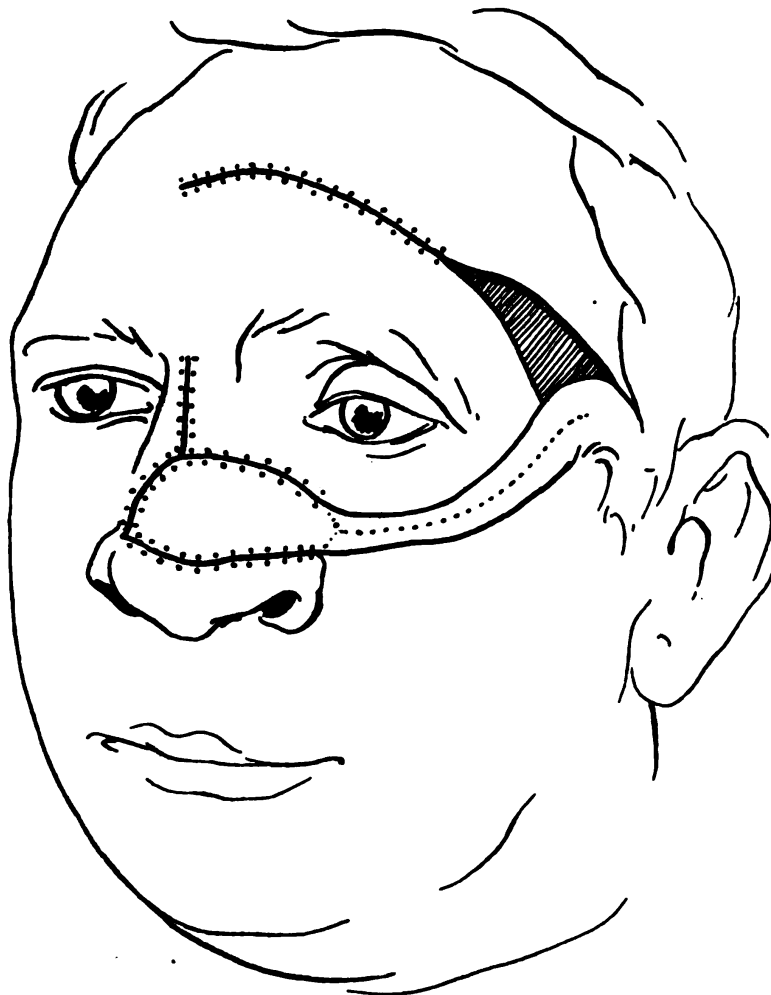


FIG. 60.—Flap in place. Pedicle tubed. Wound of forehead partly closed.

injuries to the underlying bones, the repair of which will be considered in a later section. The lips and cheeks are favorable sites for plastic operations because of their elasticity and rich blood supply. Tissue for their repair may be obtained by sliding flaps from adjacent areas or by tubed flaps from the neck, scalp, chest, or back. Correction of the line of muco-cutaneous junction or vermillion border is one of the most important factors in producing the best cosmetic result; mucous membrane for this purpose may be obtained

from the tongue or by flaps from the inside of the lips or cheek. It is remarkable how rapidly tactile sense and vasomotor control is developed in flaps brought to the face from distant parts; blushing into the transplanted skin can be demonstrated within a week after operation and tactile localization is not much slower in becoming established.

The first case shown required a rather simple operation but the change produced in the patient's appearance was very great. A deep scar extended from the base of the columella across the lip, raising and everting the angle of the mouth as shown in figure 74. The first step of the operation was excision of the scar. The attachment

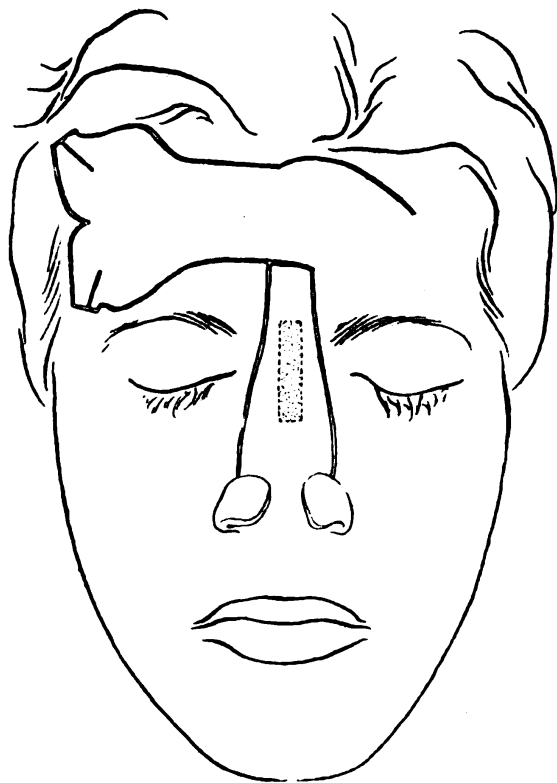


FIG. 66.—Outlines of flaps for second stage of operation.

of the upper lip to the maxilla was then severed, from the frenum back as far as the first molar. The whole lip was drawn forward and reattached, this to lengthen the lip. A flap was then turned down from the cheek (fig. 75, A) to lower the corner of the mouth. Figure 76 shows the patient five days after operation before all the stitches were removed. A month later with the aid of massage the scars had nearly disappeared and the lip remained in its proper position.

The patient next shown had suffered the loss of a large part of the upper lip and maxilla, also

fracture of the mandible, as shown in Figure 77. The missing portion of the maxilla was replaced by a prosthetic appliance and the upper lip repaired by sliding flaps from the cheeks. The result was satisfactory (fig. 78), except that the muco-cutaneous border was irregular. To correct this a flap of mucous membrane was raised from the lower lip with its base at the upper border of the lip. This was sutured to the skin along the muco-cutaneous border of the upper lip. The raw area in the lower lip was closed by undermining and sliding the adjacent mucosa. The lips were immobilized by two sutures of heavy silk passing entirely through both lips. Seventeen days later, under local anes-



Fig. 61.—After tubed flap operation.

Fig. 62.—After return of pedicle to forehead.



Fig. 63.—Rhinioplasty.

Fig. 64.—Before operation.

Fig. 65.—After first stage of operation.



Figs. 69-70.—Rhinoplasty before return of pedicle.



Figs. 71-72.—Rhinoplasty with pedicle returned.

thetia, the mucous membrane flap was freed from its attachment to the lower lip and the free edge sutured in place on the inside of the upper lip.

The next patient had lost a large part of the right cheek, including the angle of the mouth, as well as the whole of the right mandible. The tongue was adherent to the scar in the cheek. Figure 79 shows the appearance after cicatrization was complete and an appliance inserted to hold the remaining part of the mandible in position. At operation the mucous membrane was freed from the scar, extensively undercut and the free edges joined. The scar tissue was removed from the skin and the deficiency was filled by a tubed flap, carrying considerable fat, from the neck and chest. This flap, which was $1\frac{1}{2}$ inches wide and over 6 inches long, is shown in Figure 80. Two months later the tubed pedicle was resected, opened out, and used to replace the remainder of the scar tissue in the cheek. Figure 81 was taken three weeks after this operation.

Figure 82 shows a case of extensive loss of the upper lip and cheek repaired by sliding flaps from the cheek, correcting the mucocutaneous border and inserting an appliance to replace the lost maxilla. Figures 83 and 84 represent cases with more extensive loss of tissue, which were treated on the same principles.

Another patient had a large wound of the lip and chin with fracture of the mandible (fig. 85). Loose teeth were extracted and a splint applied to the mandible. After healing the condition was as shown in Figure 86. At operation the scar was excised and the mucous membrane brought together (fig. 87, flaps *b* and *c*). A flap was cut downward from the right angle of the mouth to the neck. This was lifted and sutured over the raw area left by removal of the scar. The result is shown in figure 88.

Figures 89 to 94 are diagrams showing the method of using flaps to correct the shape of the lips after removal of disfiguring scars.

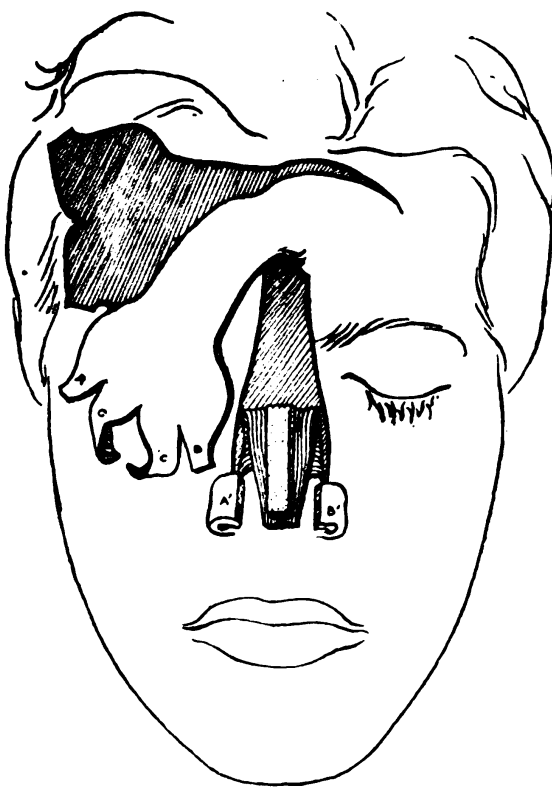


FIG. 67.—Flap containing cartilage turned down. Forehead flap cut.

The next case illustrates the use of the epithelial inlay in the mouth. The patient reached the Queen's Hospital, after having had many plastic operations in France, in the condition shown by figures 95 and 96. A mandibular bone graft had been done, using a piece of rib. It was decided to make a lower denture to improve the contour of the chin and provide for mastication, but this was found to be impossible, because there was no sulcus between the grafted bone and the lip. Figure 97 illustrates this condition; the first drawing shows the sulcus between the bone and the lip in the normal case; the second shows the condition of this patient's mouth after the bone

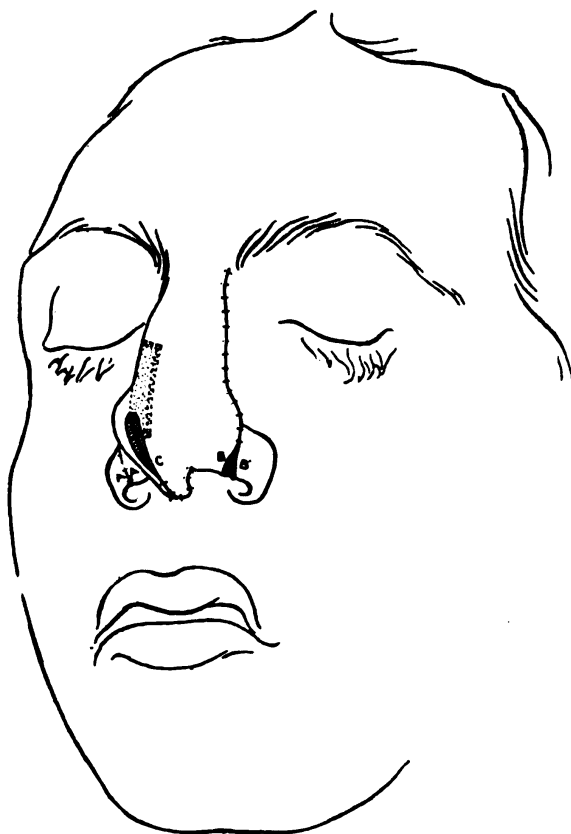
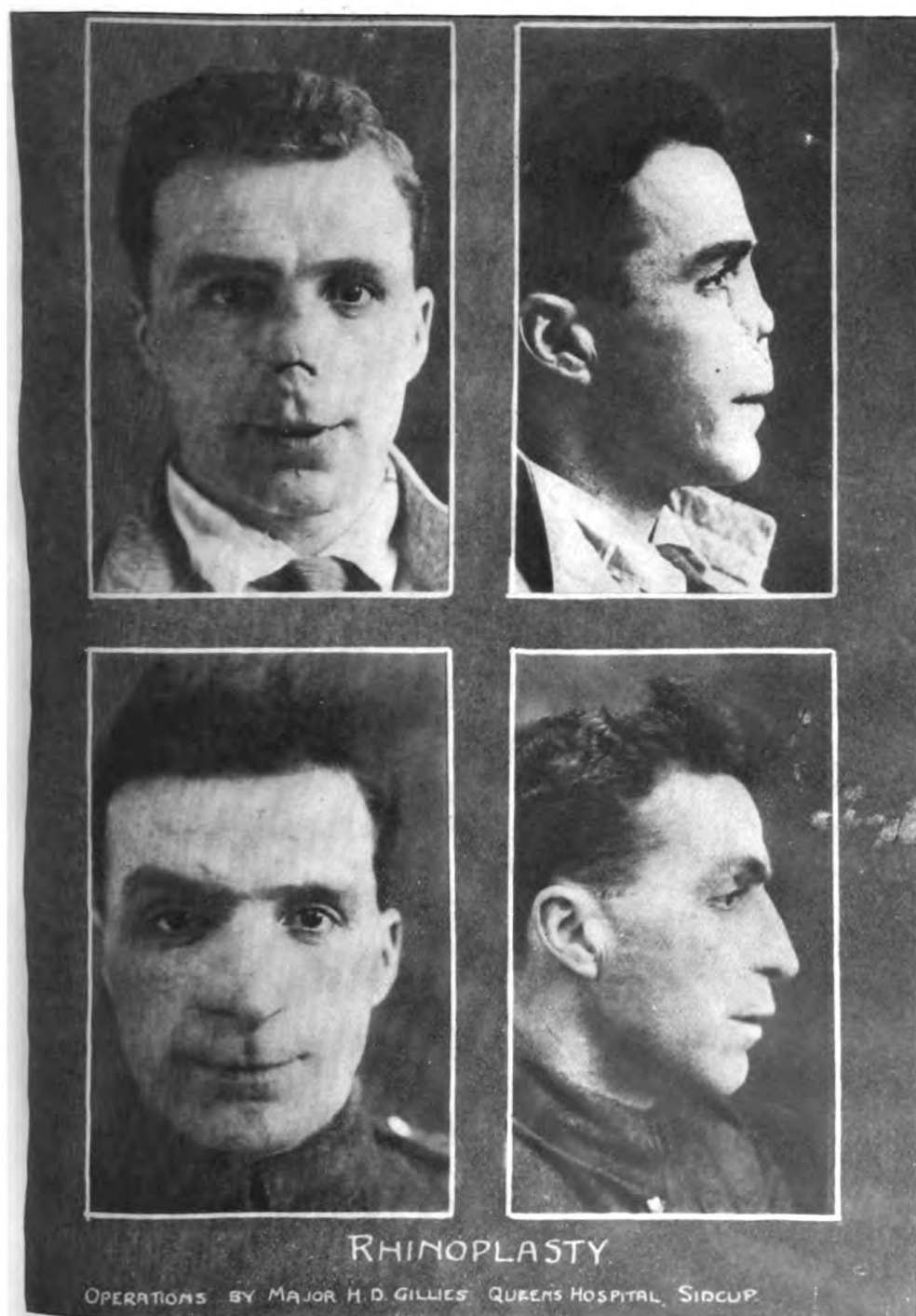


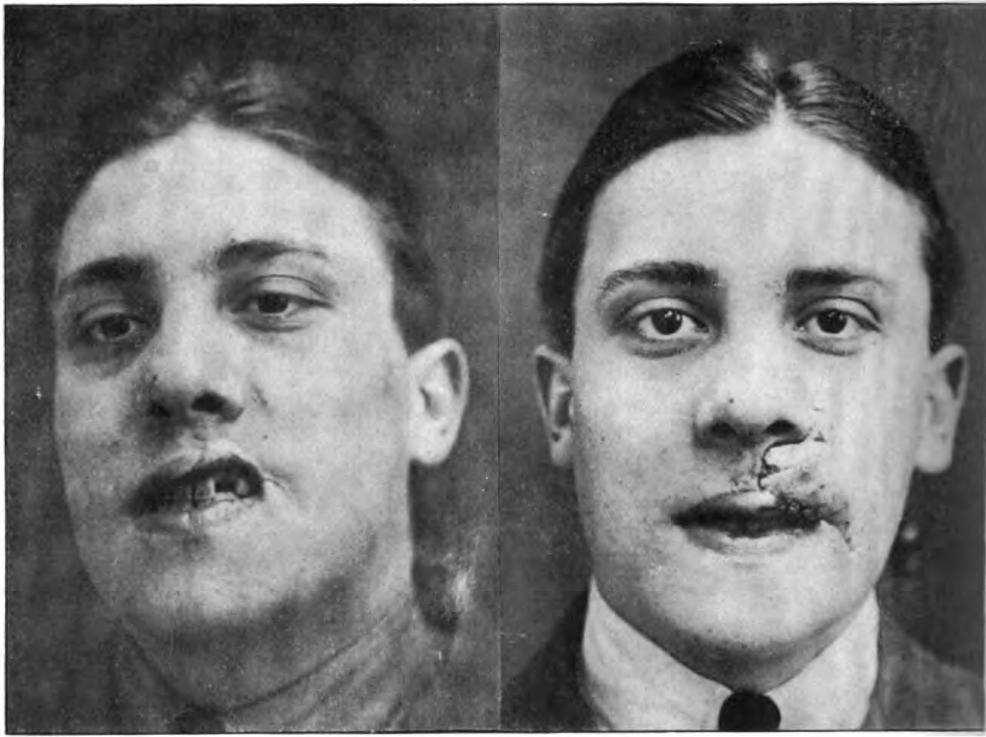
FIG. 63.—Forehead flap in place. Small lateral flaps also used.

graft operation; the other two show the steps in the inlay operation to produce the sulcus. An incision was made along the lower border of the jaw and the anterior surface of the bone exposed. Dental modeling composition (known as "stent" for short) was softened in boiling water and molded against the bone. After this had hardened a Thiersch graft was cut from the upper arm and wrapped around it with the outer skin surface toward the mold. The skin-covered stent was then placed in position against the bone and the incision closed over it. As the grafted skin grew in place an epithelial-lined pocket was formed. After eight

days an incision was made from the inside of the lower lip down to the stent, and this was removed, leaving a sulcus lined with epithelium.

Figure 98 illustrates a satisfactory method of closing holes in the palate. The stippled area represents a hole through the hard palate. The flap A is turned up and sutured to the freshened mucous membrane around the opening, thus forming the mucosa of the nasal fossa. The flap B is then rotated to cover A and sutured in position. The hole is thus occluded and there is epithelium on both sides. The raw areas left by raising the flaps may be left to granulate or may





Figs. 74-76.—Plastic repair of lip.



Figs. 77-78.—Plastic repair of lip.

be closed by undermining and approximating the edges of the adjacent mucosa. Should the opening be in the lateral wall of the antrum, the first flap may be taken from the mucous membrane lining the cheek.

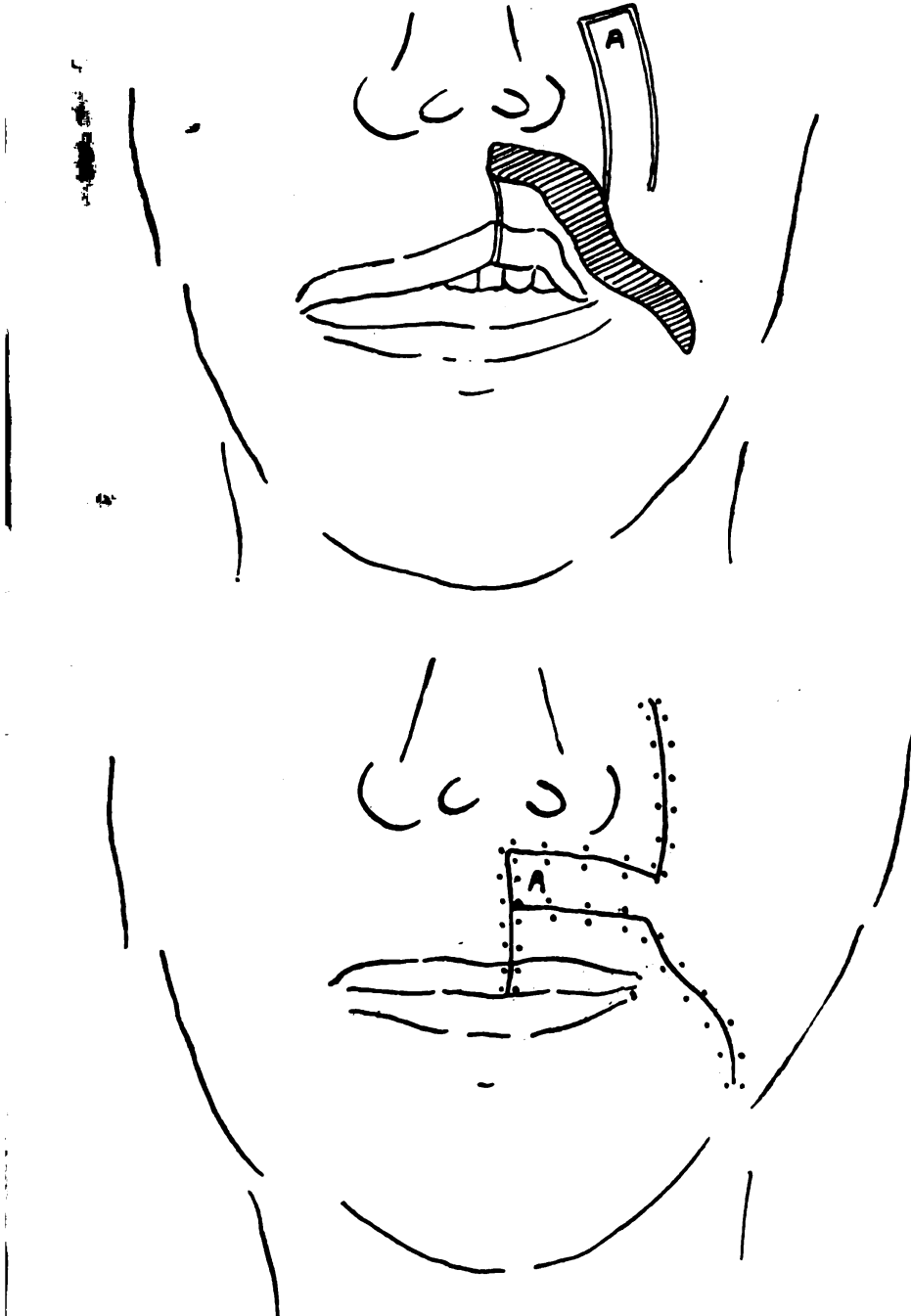


FIG. 75.—Plastic repair of lip. Excision of scar; whole thickness of lip cut through; mucous membrane pulled over to center line and sutured.

Salivary fistulæ are rather frequent, and for these the operation usually credited in America to D. Hayes Agnew is employed. The fistulous opening is dissected free, brought through to the mucous surface, and sutured there.

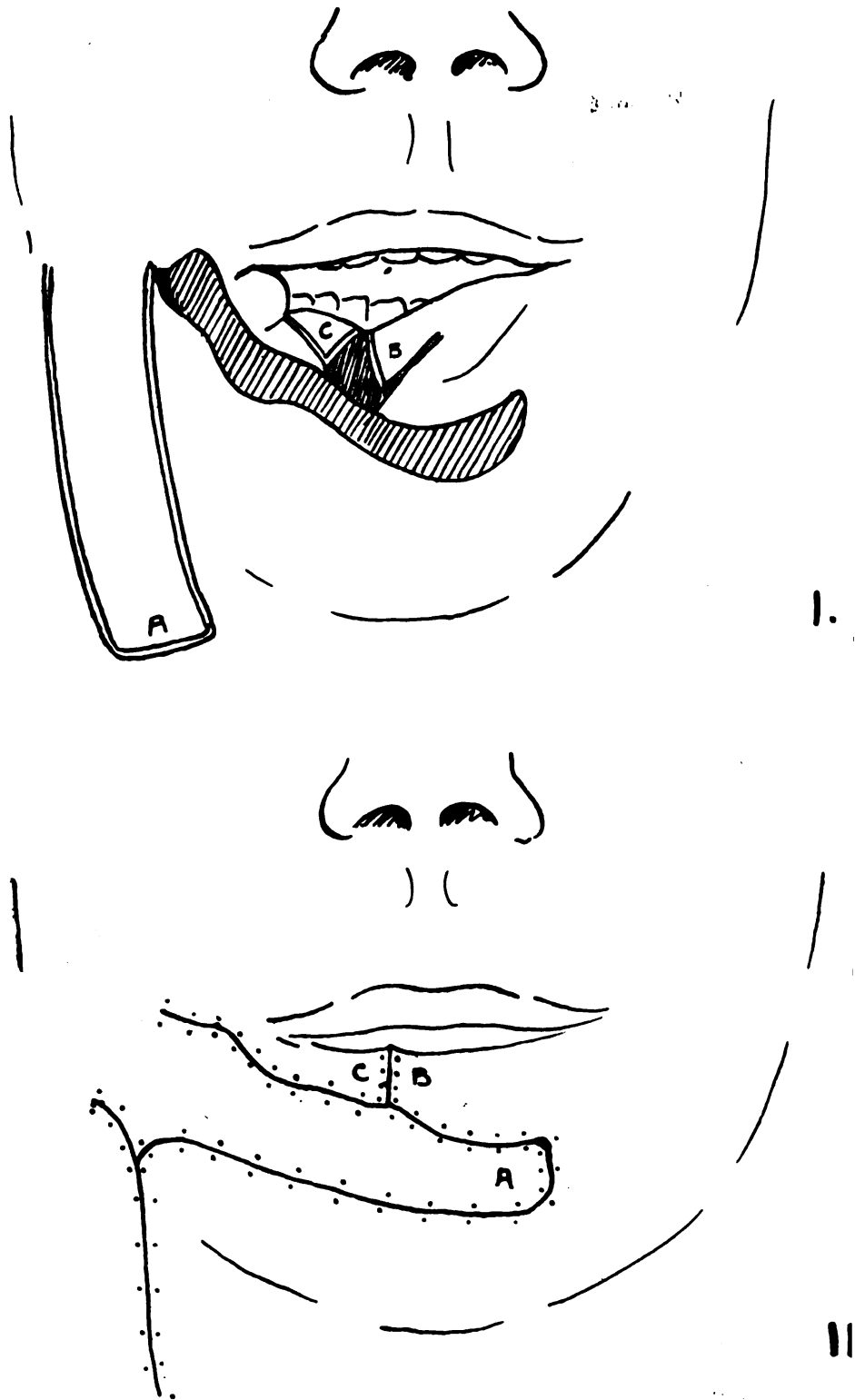


FIG. 87.—I. Scar removed; flap outlined. II Flap sutured in position.



Fig. 79.—Before operation.

Fig. 80.—First stage. Tubed pedicle to replaced tissues.

Fig. 81.—Second stage. Pedicle used to replace scar.



Fig. 83.—Lip and cheek plastic.

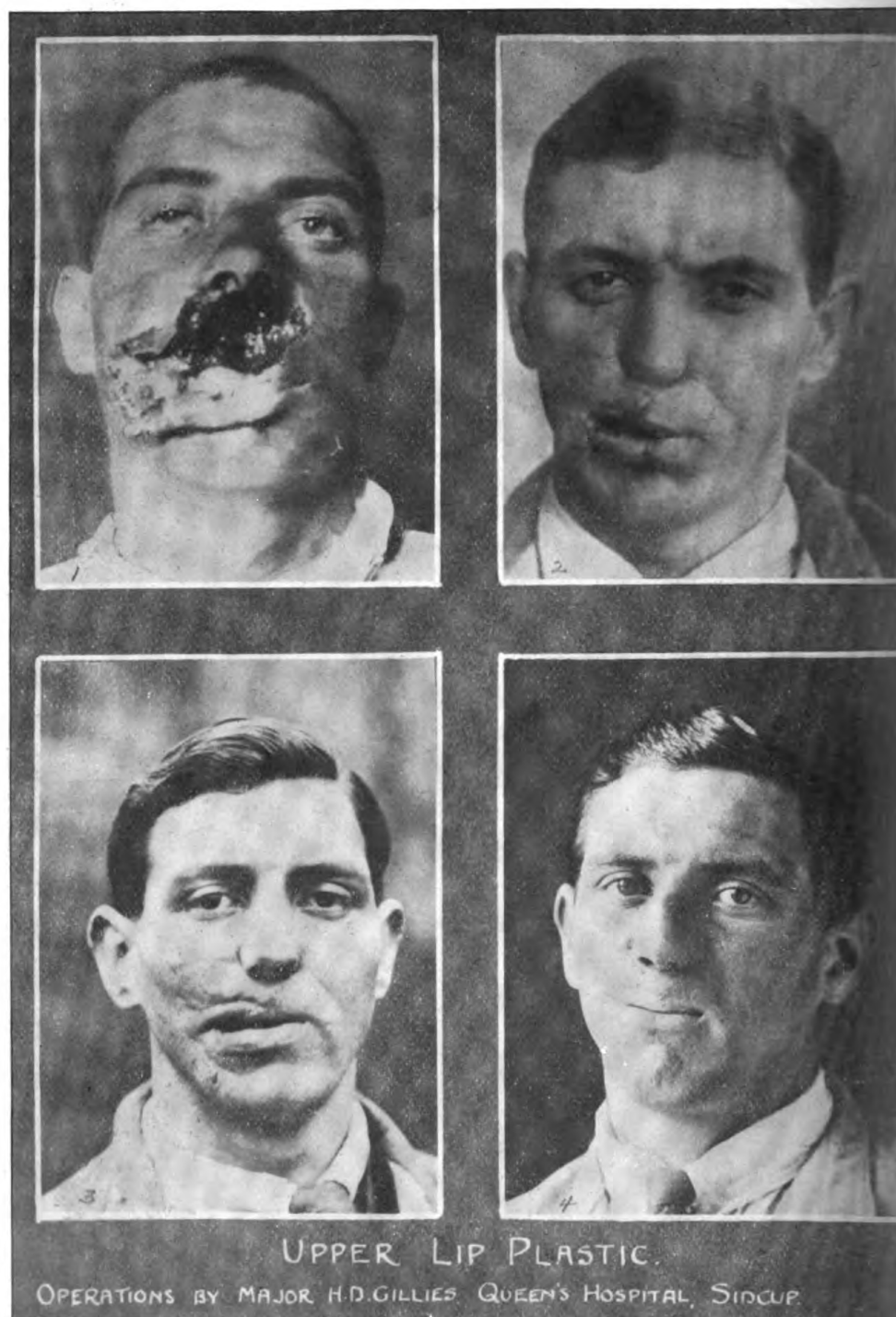




Fig. 84.

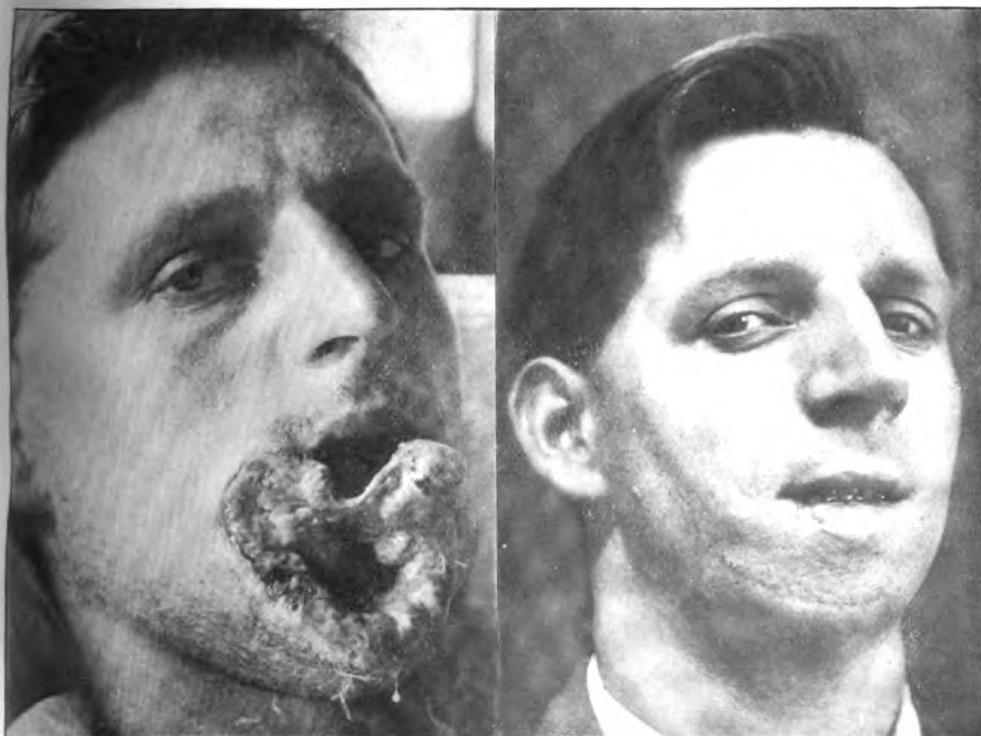


Fig. 85.—Condition shortly after being burned.

Fig. 88.—After repair of lip and chin.



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Fig. 86.—Condition after cicatrization.



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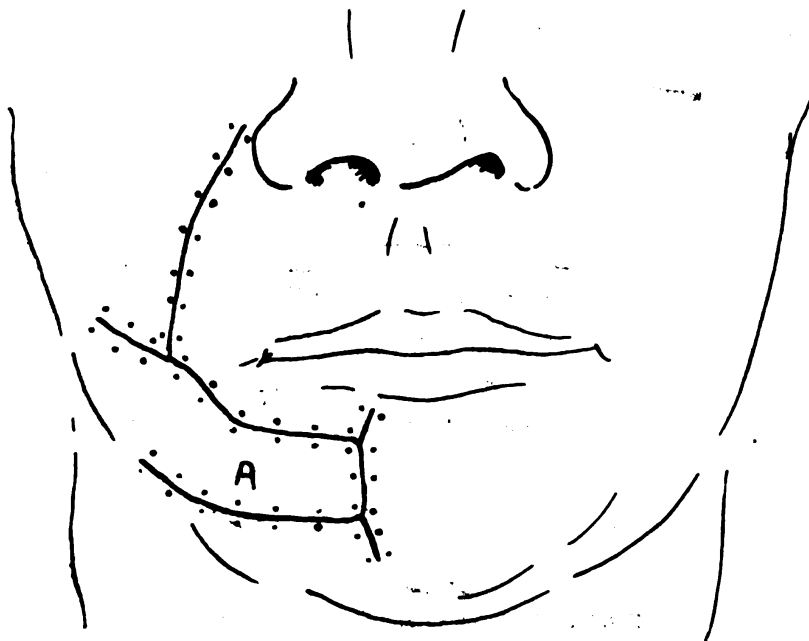


Fig 83.—Operation to remove scar and correct angle of mouth:

REPAIR OF BONE INJURIES.

Most of the injuries to the soft parts about the face and jaws are accompanied by involvement of the underlying bones. Some of

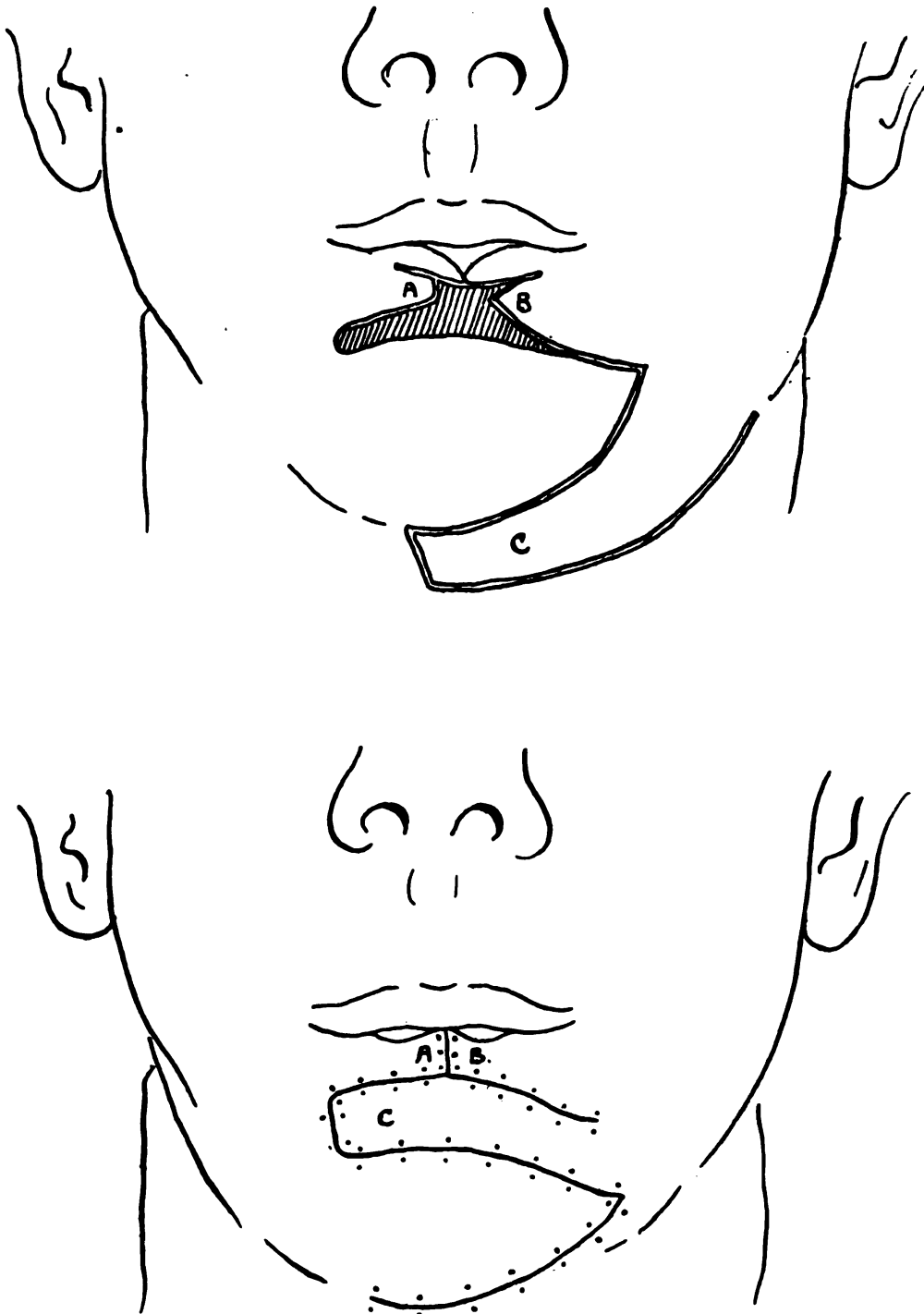


FIG. 90.—Plastic operation; lower lip and cheek.

these bone lesions require treatment for restoration of function, others merely for cosmetic effect. Injuries of the latter sort are usually about the nose, orbit, or zygoma, and the contour can be restored by

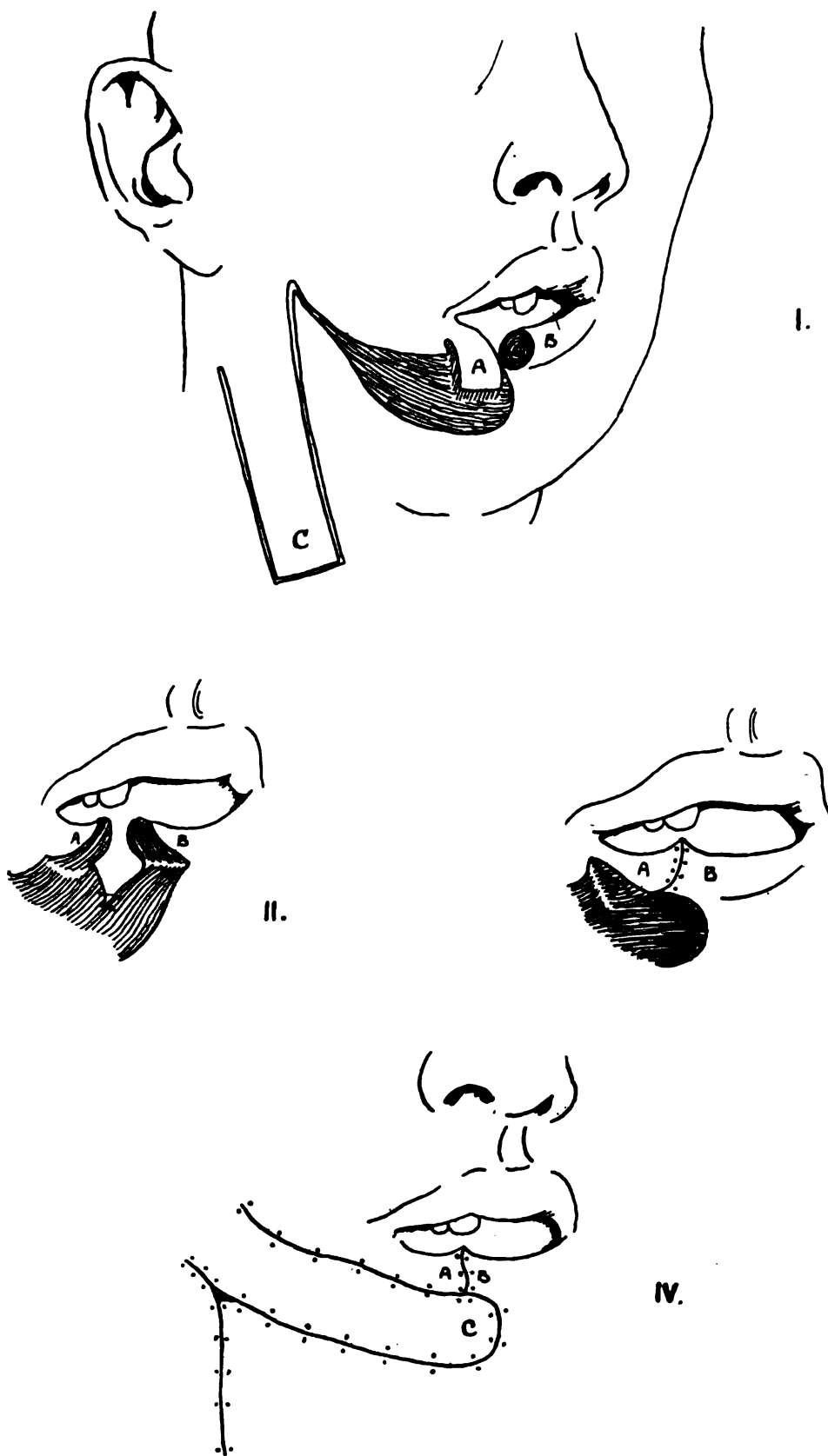


FIG. 91.—Plastic operation; lip and chin.

inserting properly shaped pieces of rib cartilage beneath the skin. Lesions of the maxilla and mandible, causing loss of power of mastication, are very numerous, but it is usually possible to produce a good functional result by proper treatment. When the maxilla is fractured the parts are restored to their proper position and then retained by wiring or by the use of the Kingsley splint. Many of the cases require appliances to replace the missing bone. Fractures

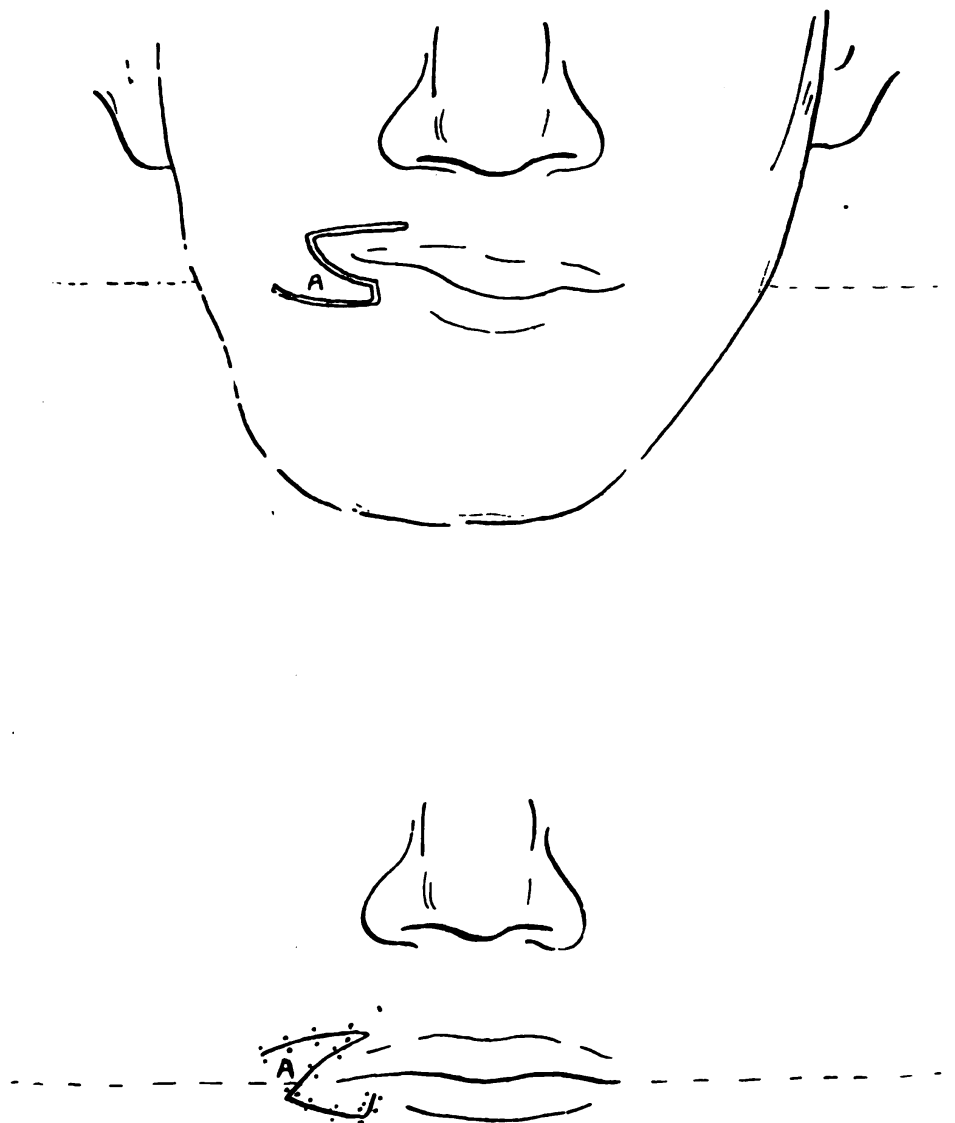


FIG. 92.—Operation to correct angle of mouth.

of the mandible, in which normal union may be expected to occur without surgical interference are generally treated by fixation with the Gunning splint (fig. 99) or some modification of it. When the loss of bone is so great that union can not be expected from splinting alone, a bone-graft operation is usually done. Nothing impressed me more strongly than the large number of successful bone-graft operations that I saw.

Like most of the operations at the Queen's Hospital the mandibular bone-graft operation has been developed by trying out all known methods in a large number of operations until the simplest successful technic is developed. The pedicle graft shown in figure 100 consists in cutting a portion of the lower border of the larger fragment, with the soft tissues attached, and sliding it over to fit into a notch in the smaller fragment. This is difficult and does not make

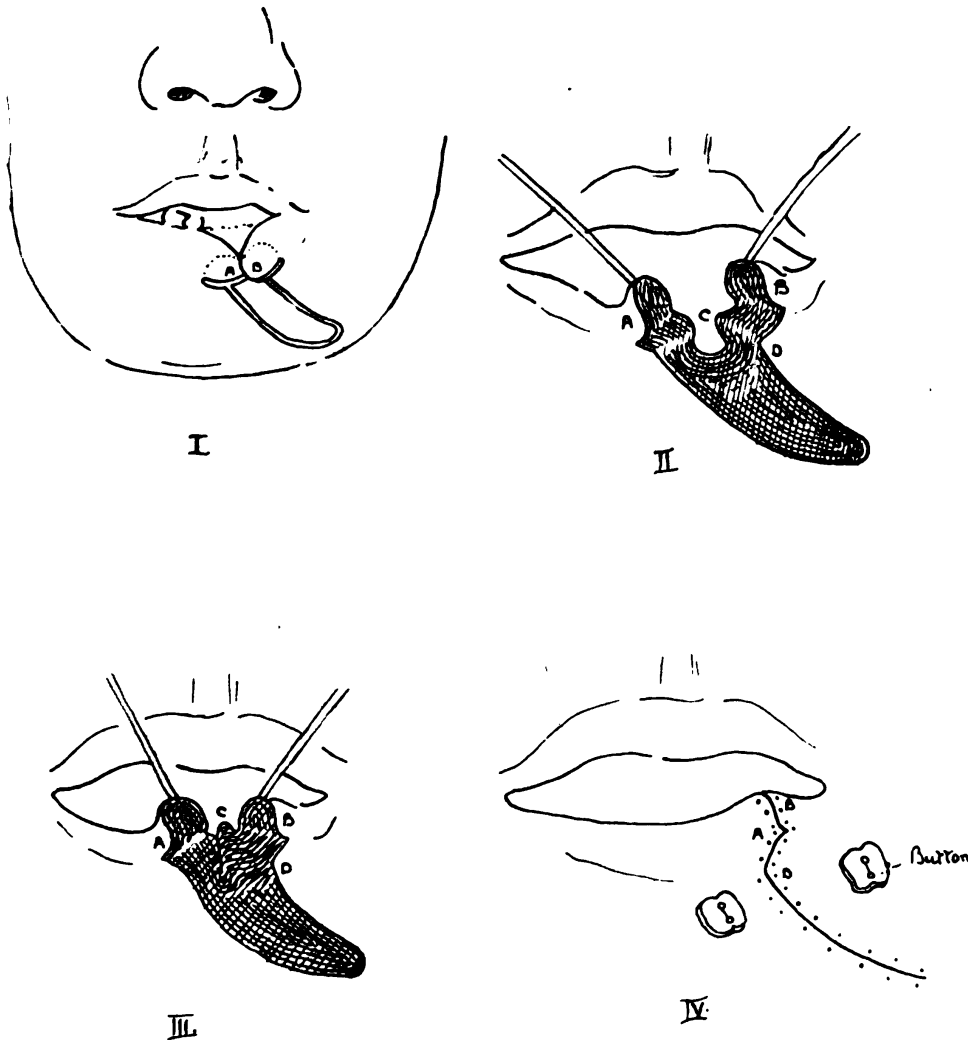


FIG. 93.—Correction of deformity of lower lip.

a very strong union, so it is rarely used. The rib graft illustrated by figures 101 and 102 is useful when a large portion of the body of the bone is to be replaced. Figures 103 and 104 are radiograms taken after such operations.

Maj. Gillies and Maj. Chubb have worked out a simple and satisfactory operation in which bone from the crest of the ilium is used. Bone of almost any required size and shape may be obtained from this source, even the angle of the jaw may be replaced by using the

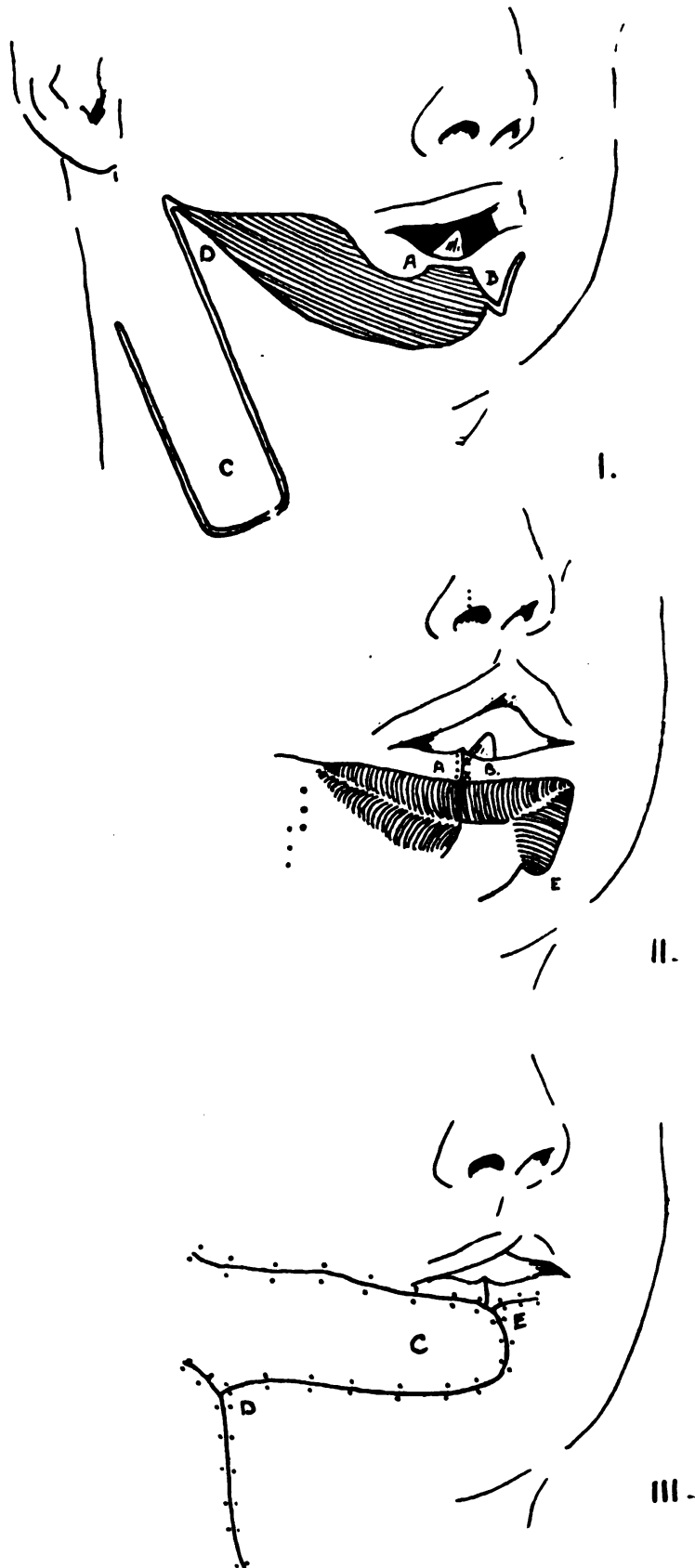
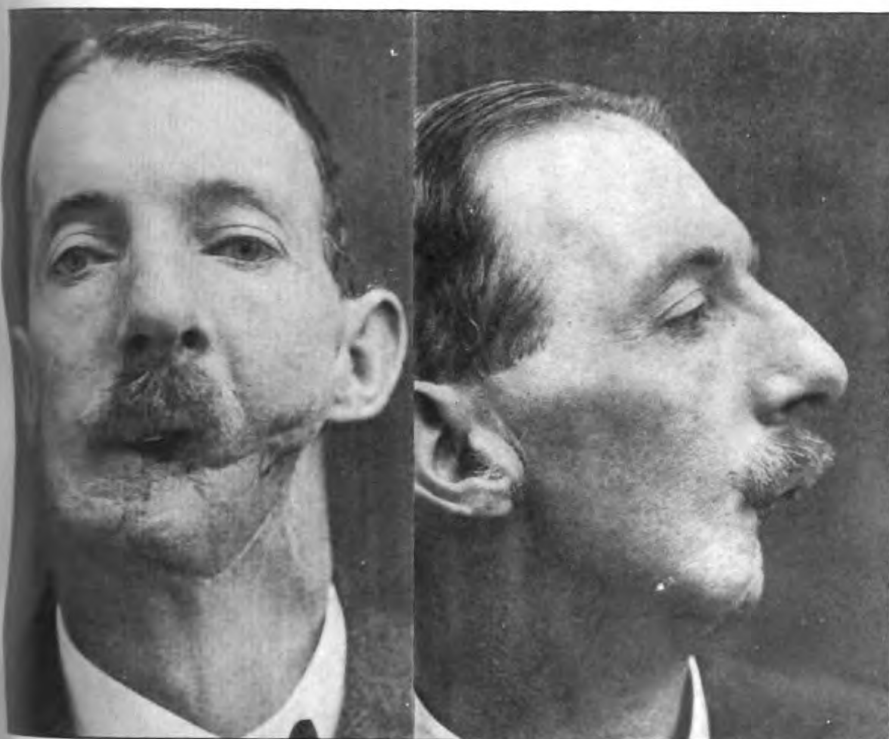
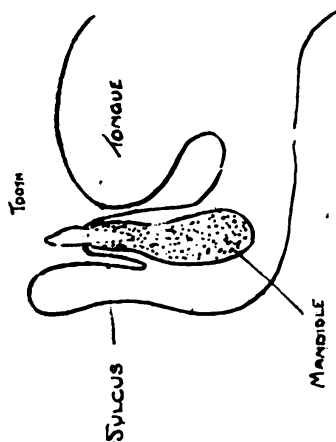


FIG. 94.—Operation to correct shape of lower lip.

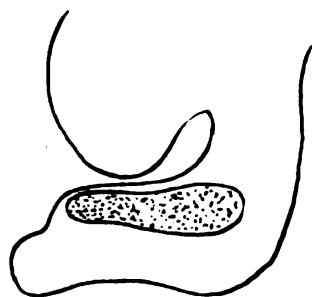


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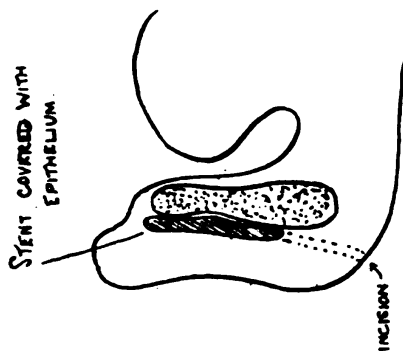
Figs. 95-96.—Condition on arriving at hospital.



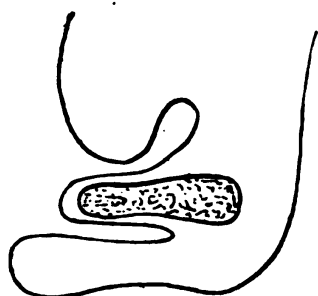
NORMAL CONDITION.



CONDITION ON ADMISSION
SHOWING OBLITERATION OF
SULCUS



EPITHELIAL INLAY OPN.
SHOWING STENT PLACED
IN POSITION BY INCISION
UNDER CHIN.



LATER.
STENT REMOVED FROM
INSIDE OF MOUTH
LEAVING SULCUS COVERED
WITH EPITHELIUM

Fig. 97.—Formation of sulcus for lower lip.

anterior superior spine. As a preliminary to the operation the jaws are splinted with the parts in proper position. The upper and lower

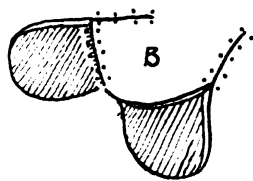
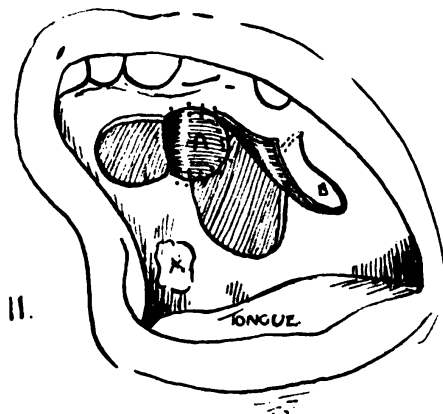
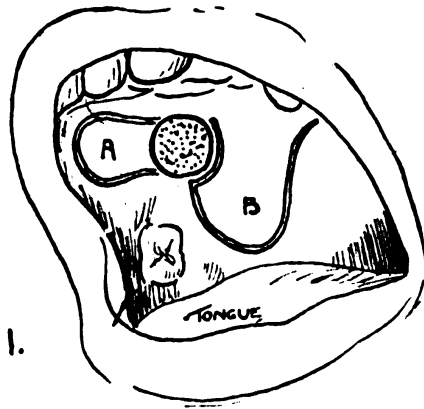


FIG. 98.—Operation to close hole in palate. Stippled area, hole in palate. A. Cheek flap turned to cover hole. B. Palatal flap swung to cover A and sutured.

ness, the ends are cut, the holes drilled, and all the shaping necessary to make it conform to the pattern is done before

splints have lugs through which pin is inserted to hold them together (fig. 99); these pins can be removed and the jaws separated in case of any anesthetic emergency though this is rarely necessary.

An incision is made along the lower border of the mandible down to the bone, and the skin excluded by sewing cloths or rubber dam to the edges. The fragments are then exposed for an inch or more on each side of the fracture and the periosteum raised, beginning at the lower border and using great care not to penetrate into the mouth. The tissues between the fragments are pushed toward the mouth until the ends of the bones are well exposed. The ends are then trimmed with bone-cutting forceps until healthy bone is reached and the ends bleed. Holes are drilled at the ends and the wires threaded through them. Heavy silver wire is used for this in the British section, while Major Waldron of the Canadian section uses soft iron wire. A pattern of the bone required to fill the gap is made with heavy tin foil or sheet lead. The area over the crest of the ilium is now prepared and an incision made down to the bone. The skin is excluded by cloths or rubber dam sewed to the skin edges. The muscles and fasciæ attached along the crest are not cut adrift and the required amount of bone is exposed. The crest is chiseled to the required thickness,

separating it from the ilium, as the piece is difficult to hold after it is cut loose. After the graft is separated the assistant closes the wound while the operator proceeds with the insertion of the graft. Both wires should be threaded through the holes before either of them is twisted tight. The tissues are then closed over the graft and the skin sutured with horsehair. The splints are kept in place for three months and the process of healing observed by frequent radiograms. Figures 105 and 106 show diagrammatically the steps of the operation and the final appearance. The elaborate wiring of the posterior fragment in figure 105 is not necessary. Figure 107 is a radiogram showing the result of such an operation.

Mr. Chubb states that, in his experience, it makes no difference whether or not the periosteum is retained on the transplanted bone.

He makes no effort to preserve it or to cover the graft with periosteum after it is in place. To the observer it appears remarkable that there is no disunion after severing the contents of Poupert's ligaments and the powerful muscles of the thigh and attaching them to the ilium. The patients are kept in bed for several weeks and within a few days after getting up they are as strong as ever.

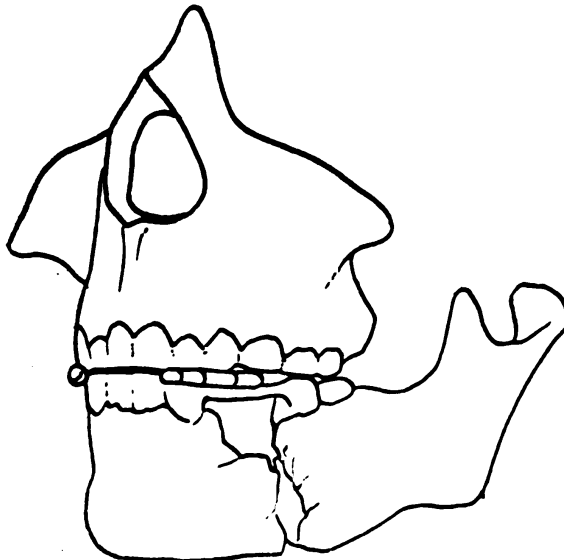


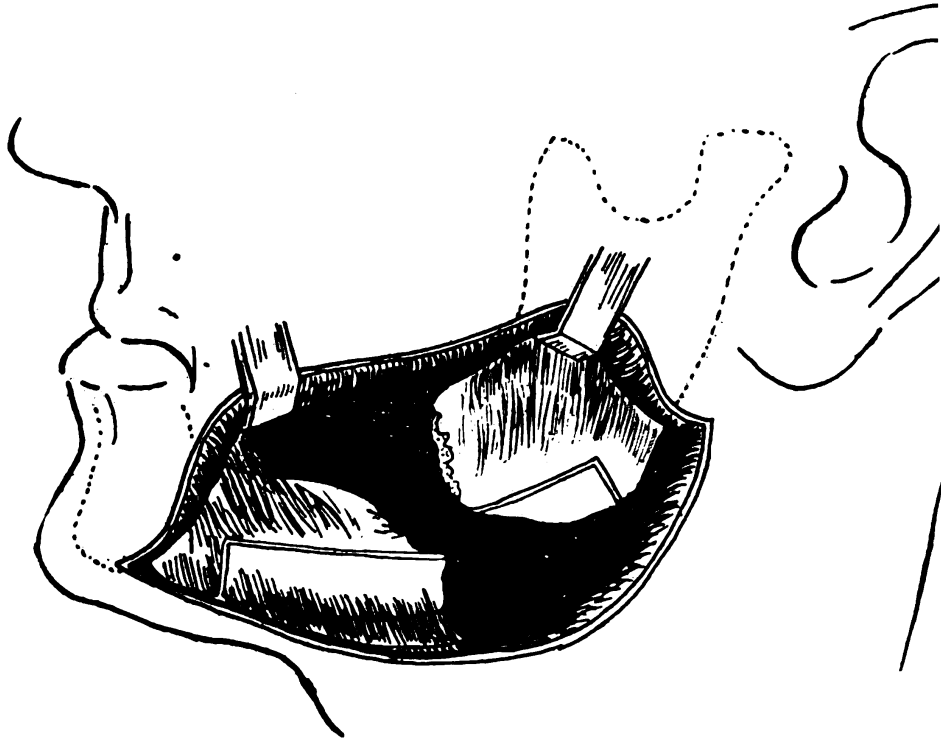
FIG. 99.—Gunning splint for fracture of mandible.

Figure 108 is an interesting example of the dental anomalies that are found in many patients. This officer was injured in a motorcycle accident, having the maxilla caved in and the mandible fractured on the left side. The radiogram showed three erupted teeth, one just below the left orbit, under the wire and one lying horizontally near the symphysis.

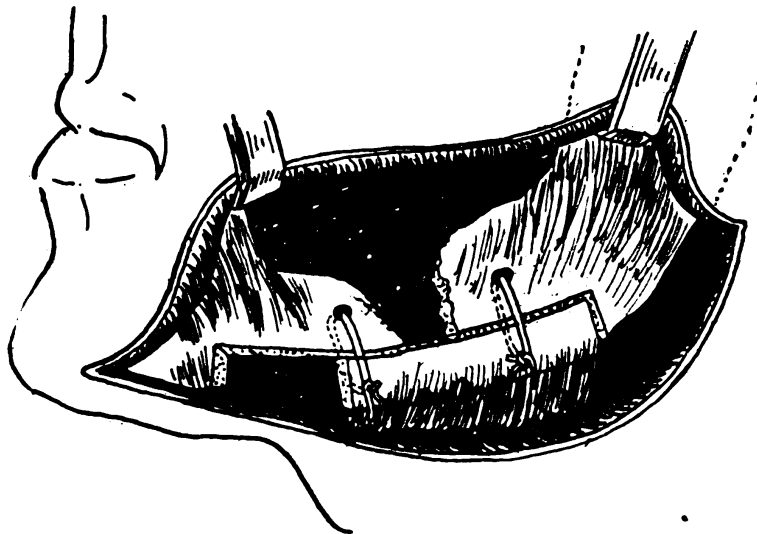
PROSTHETIC APPLIANCES.

The dental department, which is under the charge of Capt. W. E. Fry, has many difficult and unusual problems submitted to it for resolution. An effort is made to provide every patient with good denture apparatus, either natural or artificial, before he leaves the hospital and there is seldom a case which does not require something different from the usual denture seen in civil life. Loss of bone,

faulty alignment or callus following fracture, holes in the bone, hollows to be filled out and tender scars to be considered are



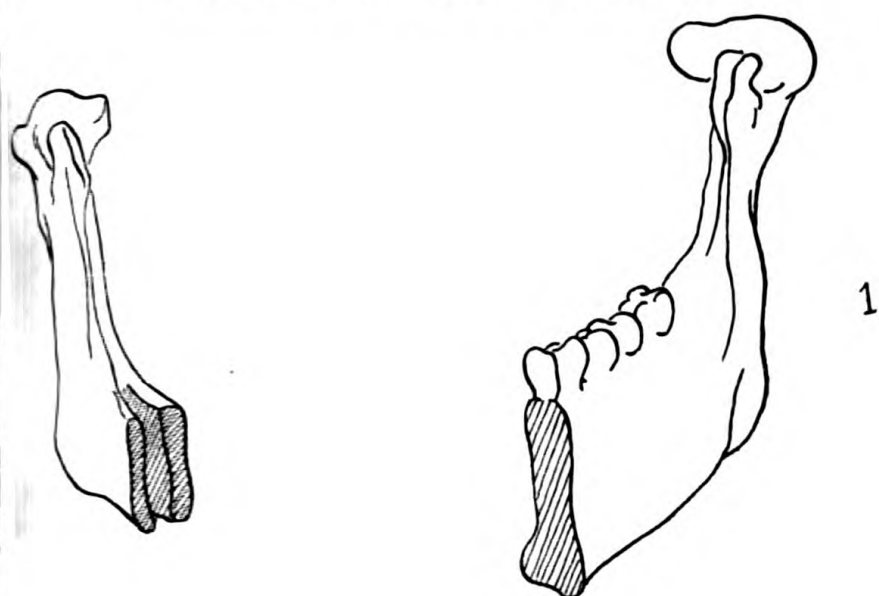
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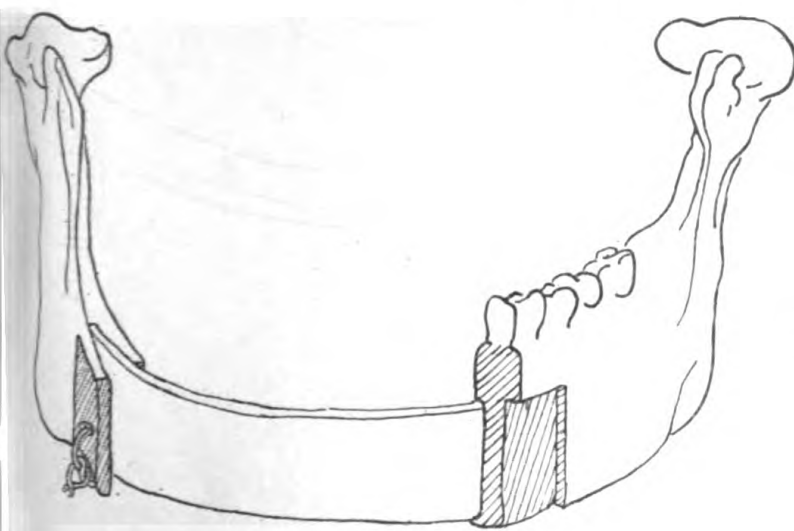
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FIG. 100.—Pedicle bone graft operation on mandible.

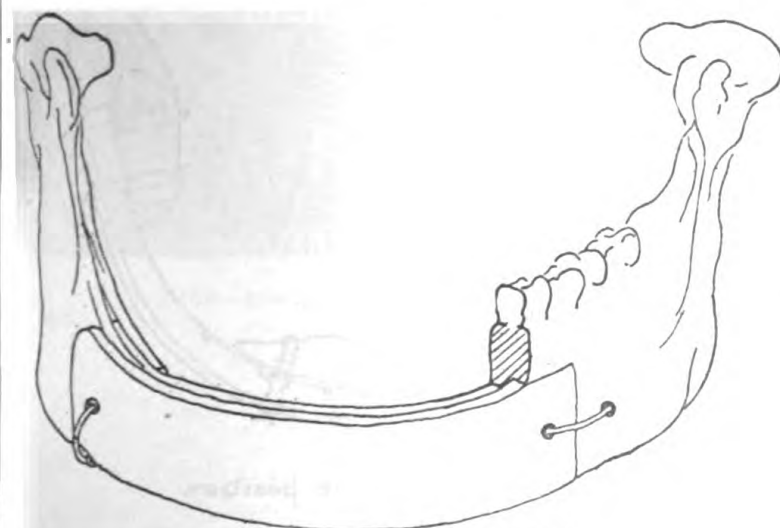
of the complications frequently met which require great ingenuity and mechanical ability to overcome. A number of the members of surgical and dental staffs are graduates in both dentistry and medicine.



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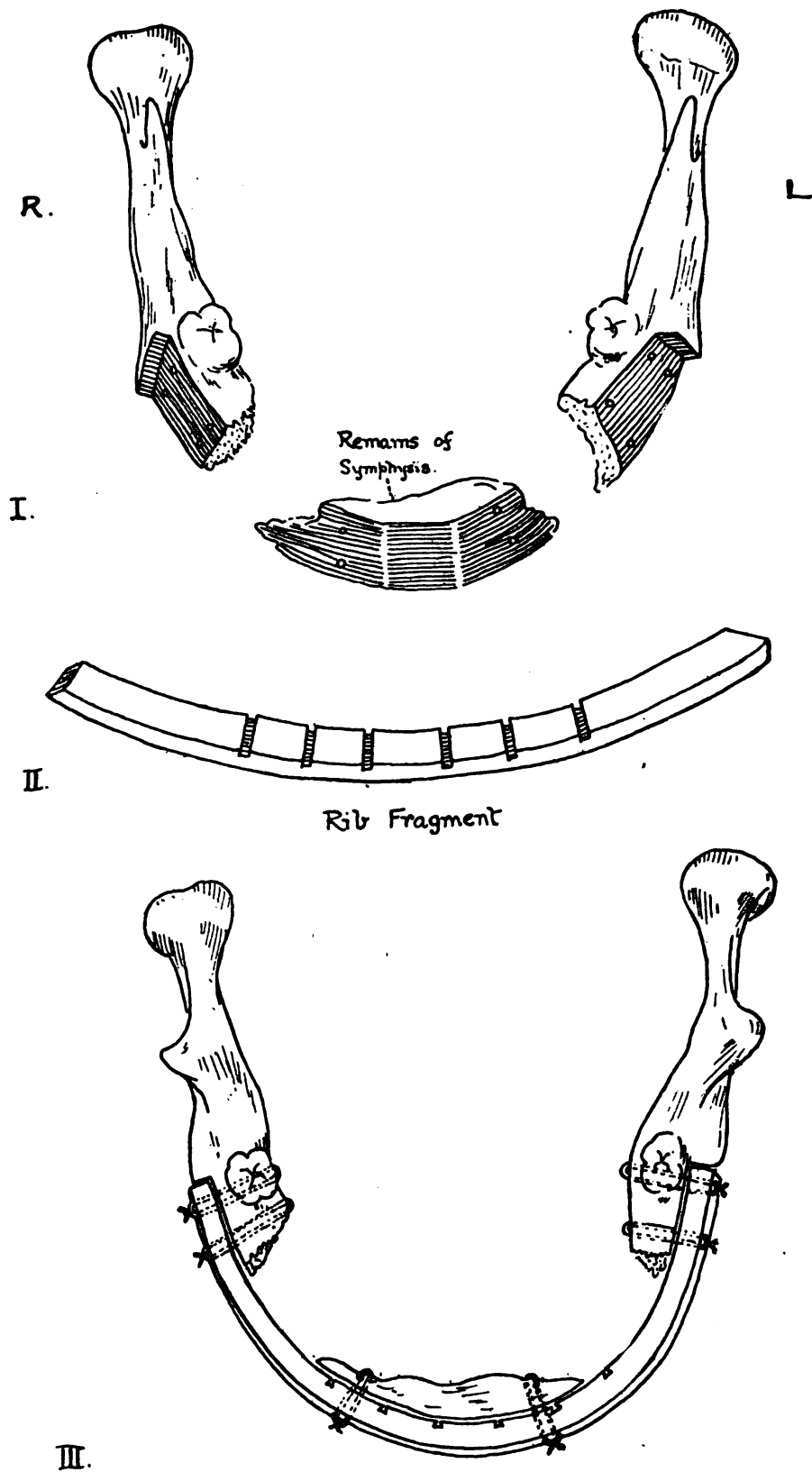
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FIG. 101.—Rib graft on mandible.

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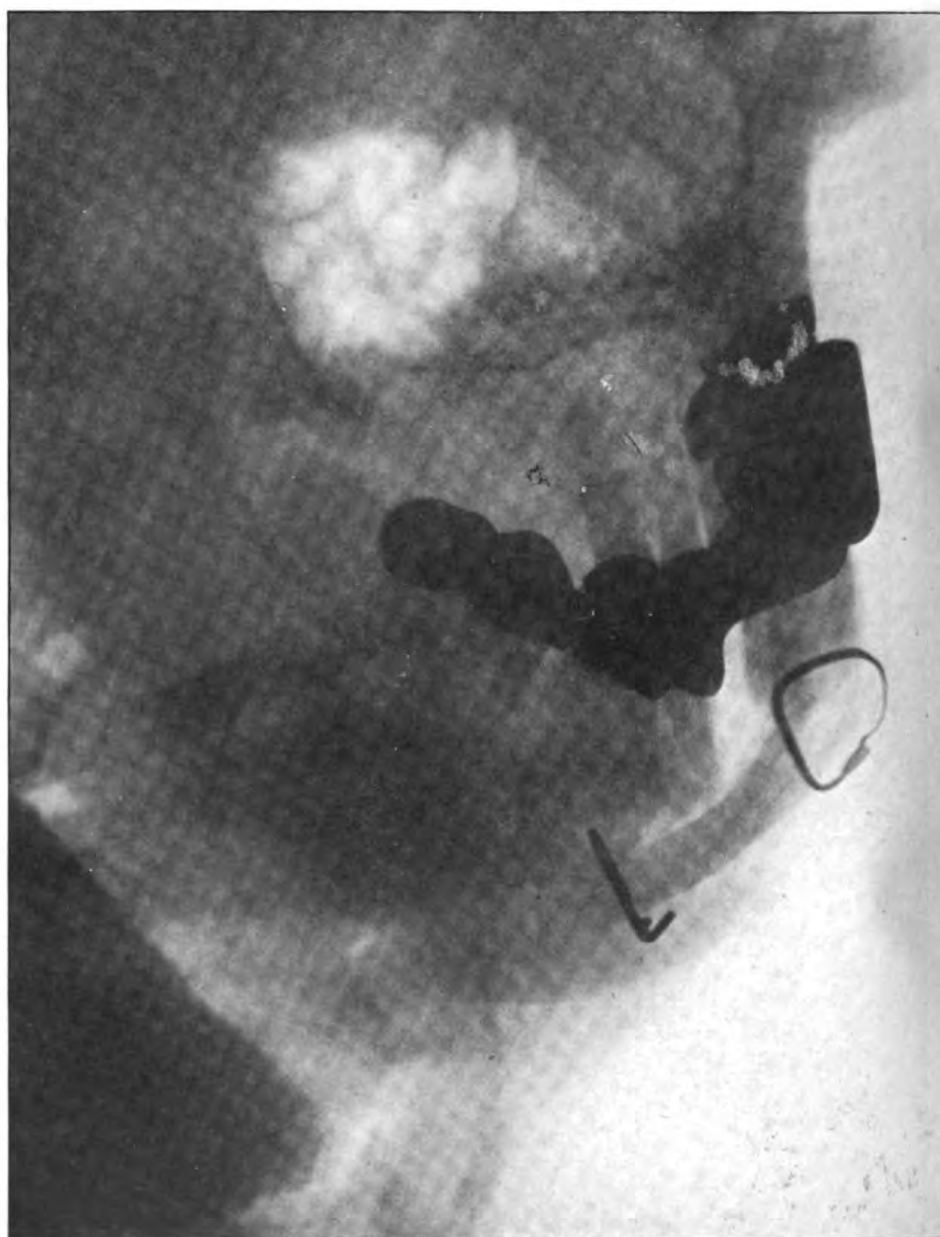
Rib Graft wired in position

FIG. 102.—Rib graft on mandible.

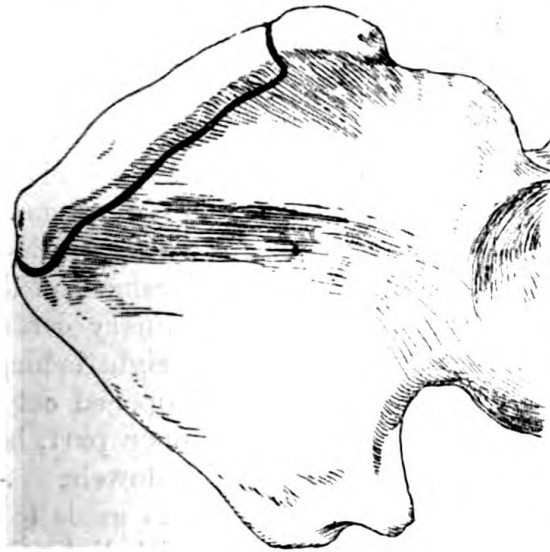


Fig. 103.—Radiogram after mandibular bone graft operation.

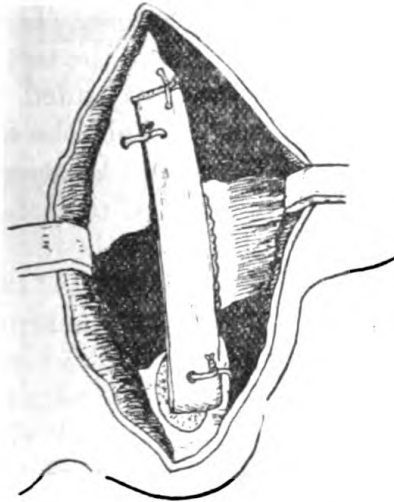
60-1



60-2 Fig. 104.—Radiogram after mandibular bone graft operation.



PORTION OF BONE REMOVED
FROM ILIUM.



ILIAC BONE GRAFT TO MANDIBLE

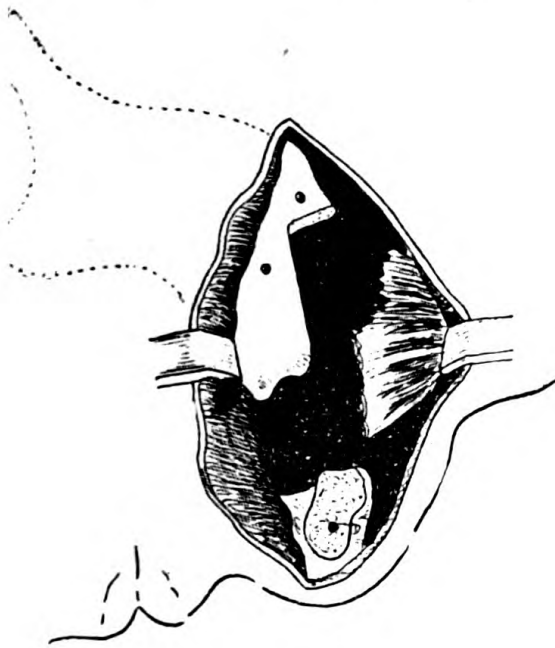


FIG. 105.

cine, and a knowledge of both branches is invaluable in working out these problems.

Figure 109 is a photograph of a plate made for a case very similar to that shown in figures 77 and 78. It was necessary to replace the premaxilla and a part of the palate, also to hold the upper lip in position and provide a support for the columella of the nose. Figure 110 shows a denture made for a case in which there was loss of the lower anterior teeth and a displacement of the alveolus, producing a deep undercut so that an ordinary denture could not be securely seated. The part shown at the right is hinged at the center so that it can be folded, inserted, and opened out with the flange in place below the undercuts. The upper part, bearing the teeth, fits down on this and is held in place by dowels.

The appliance shown in figure 111 was made to hold a Thiersch graft in place after an operation to epithelialize the inside of the nose. The cap was cemented to the teeth, while the prongs extended into the nostrils to hold the epithelial inlay.

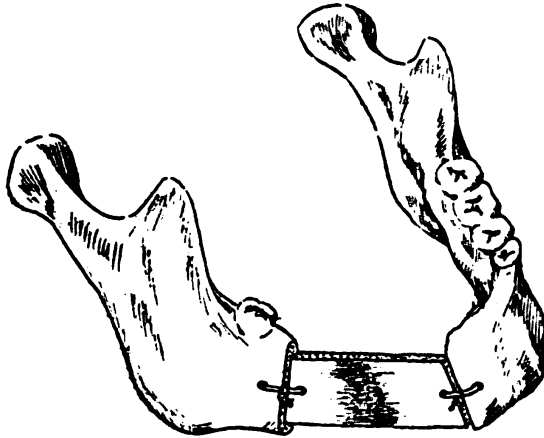


FIG. 106.—Iliac bone graft to mandible.

A patient who had lost most of the left maxilla was fitted with the denture shown in figures 112 and 113. The parts of the appliance and a model of the roof of the mouth are shown in the first picture; the second shows the complete denture, the left side of which projects into the antrum.

The next group of photographs shows a patient with hemophilia who survived a severe shrapnel wound. Because of this condition the apparatus was used instead of operation. In figure 114 he is wearing the denture, and the arm which holds the face plate is shown. When this arm is swung to the front and is passed through the tube on the rear of the face plate the rubber band keeps the plate pressed firmly against the face. Figure 115 shows the entire apparatus in position; figures 116 and 117 show the denture and the back of the face plate.

Three views are shown of a patient who had lost a large part of both maxillae. At operation the soft parts were freed from their adhesions to the maxillae and the cavity thus formed was epithelialized by the inlay method. An apparatus in three pieces was made and inserted to support the face. Figures 118 and 119 show him without the apparatus and figure 120 with it in place. The repair of the nose has since been begun.

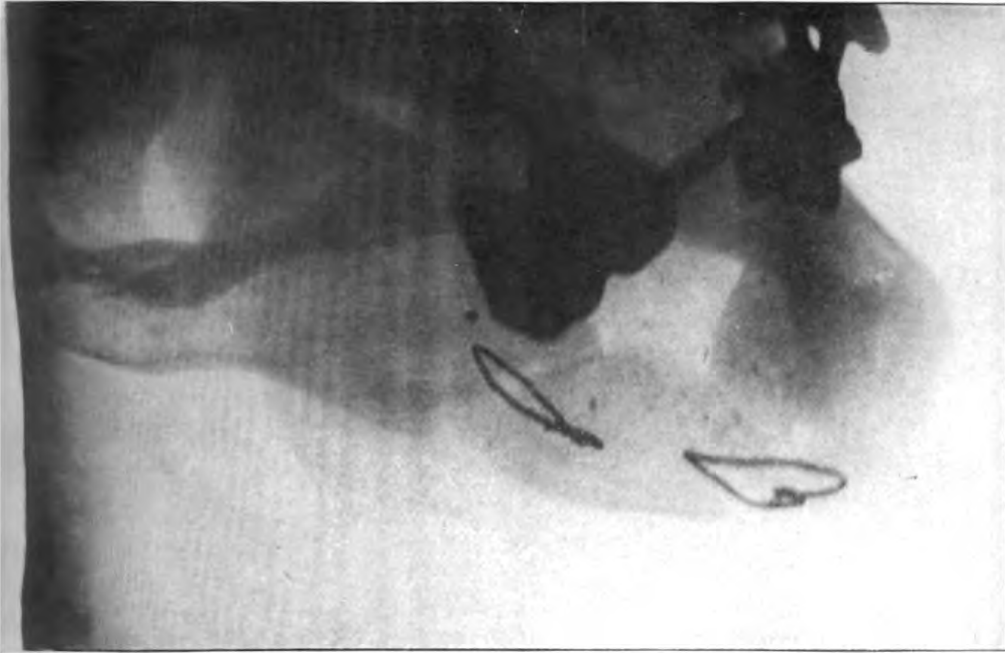


Fig. 107.—Radiogram of mandibular bone graft.

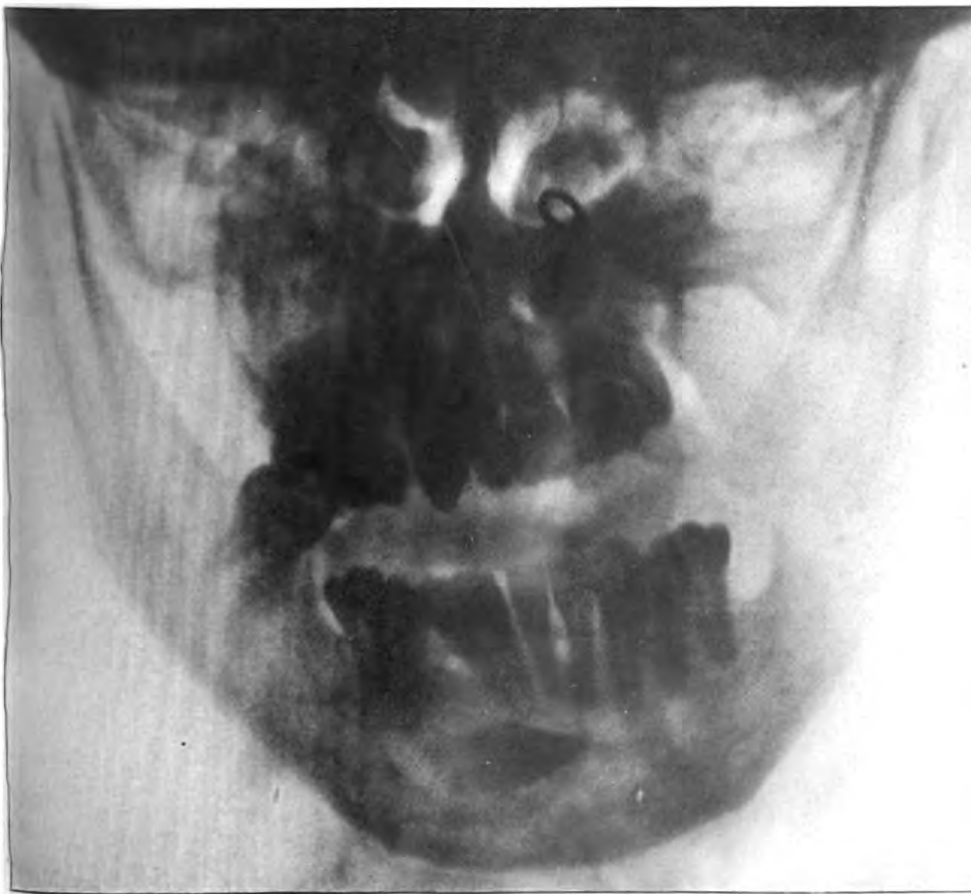


Fig. 108.—Unrupted teeth found after injury.



Fig. 109.—Appliance to replace premaxilla.

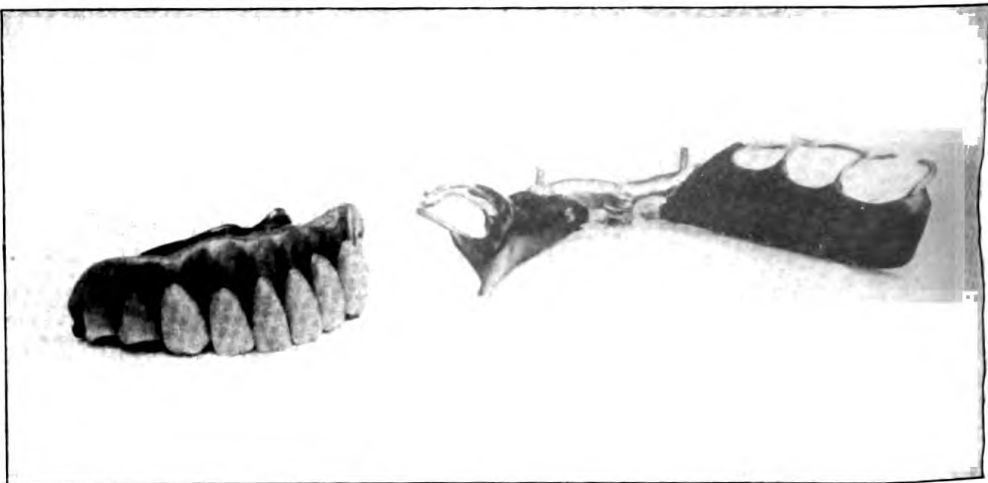


Fig. 110.—Lower denture in two parts.

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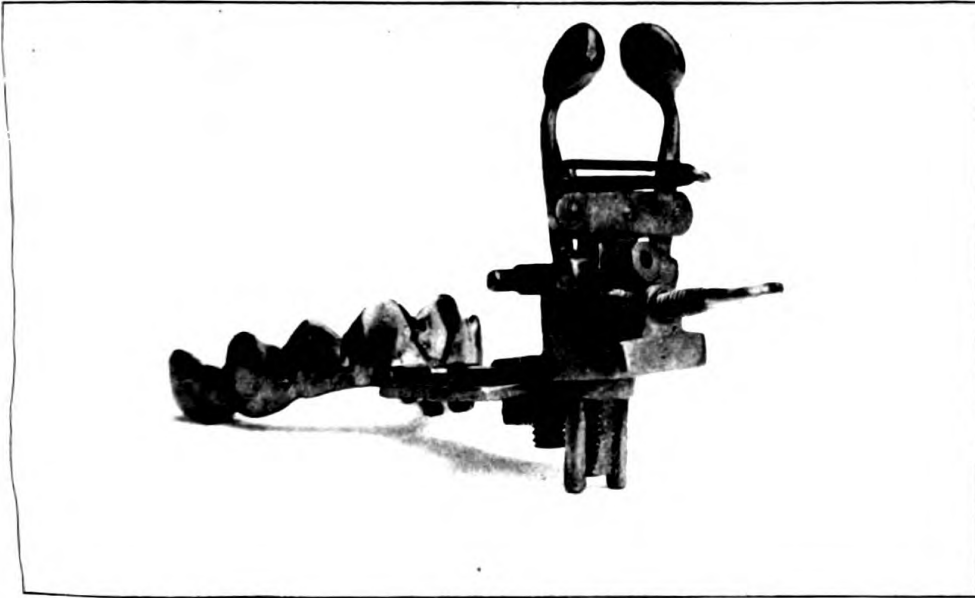
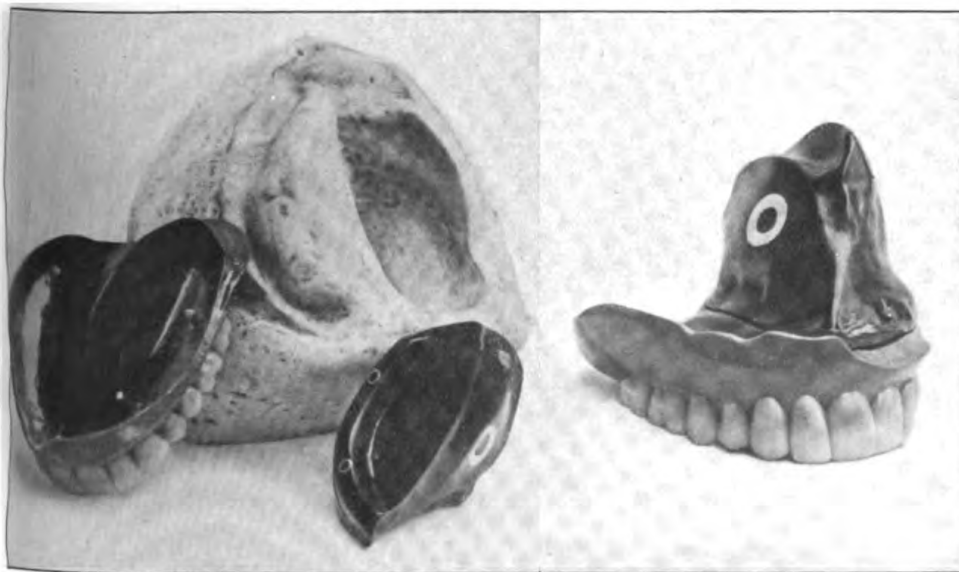


Fig. 111.—Retaining appliance for nostrils.



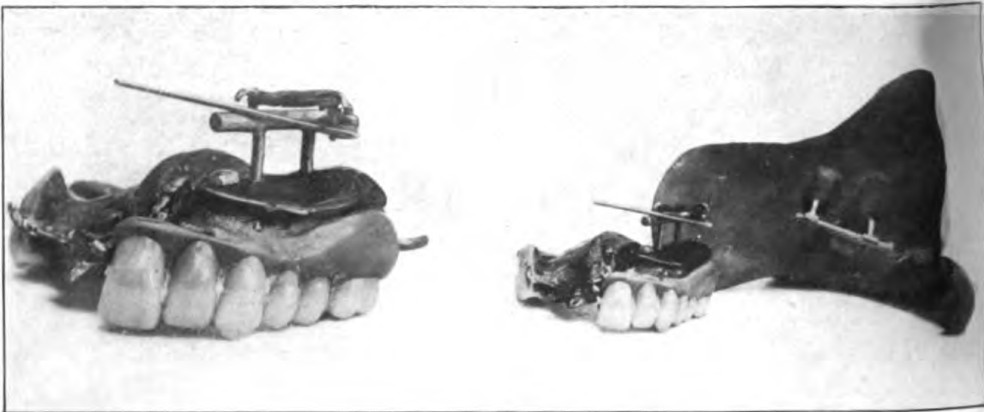
Figs. 112-113.—Apparatus to replace maxilla.

62-3



Fig. 114. Without prosthetic appliance.

Fig. 115.—With prosthetic appliance.

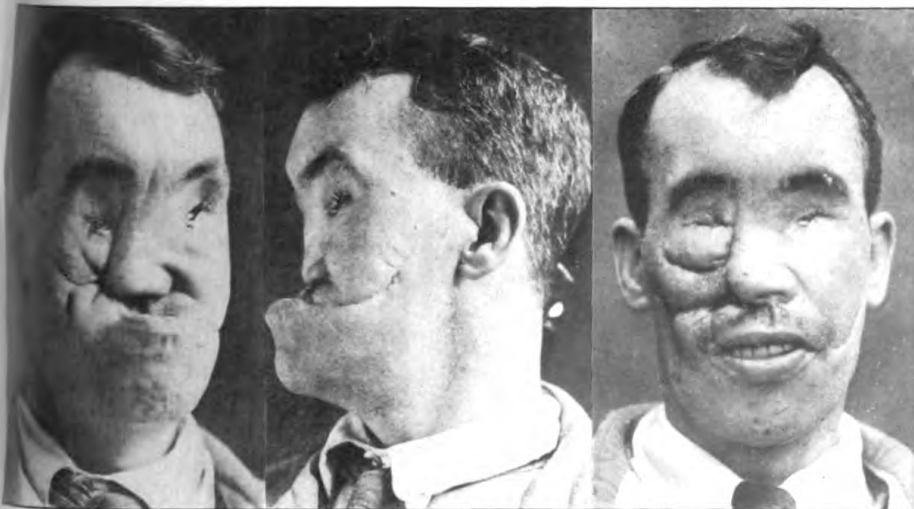


Figs. 116-117. —Prosthetic appliance worn by patient in Figs. 114 and 115.



Figs. 118-119.—Before insertion of apparatus.

Fig. 120.—Apparatus in place.



Figs. 121-122.—Before operation.

Fig. 123.—After operation;
appliance in place.

62-5

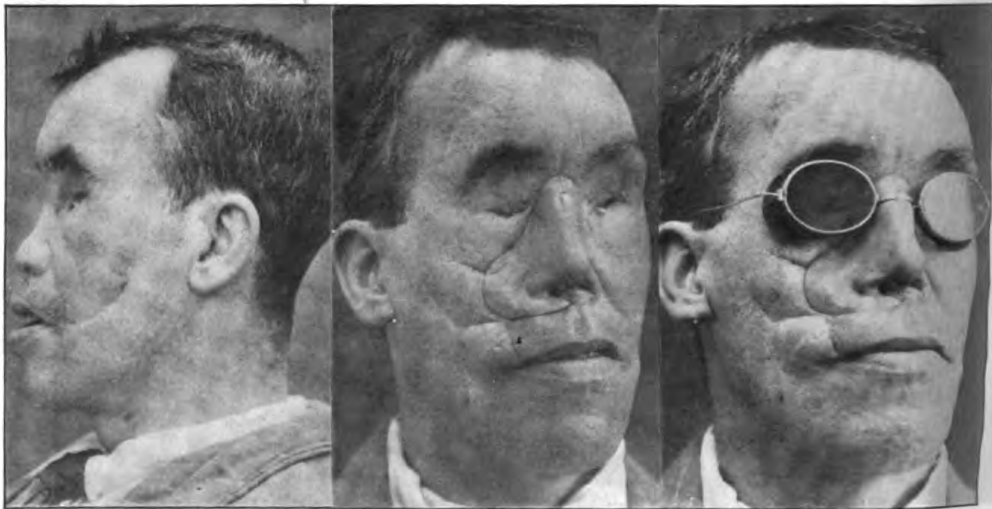


Fig. 124.—After operation;
apparatus in place.
62-6

Figs. 125-126.—Complete apparatus in place.

The next patient also shows the results of combined operative and prosthetic treatment. Both eyes and the greater part of both maxillæ were lost, producing the condition shown in figures 121 and 122. An apparatus was made consisting of an upper denture with an extension upward into the nasal fossa which could be forced forward by a nut and bolt. At operation a preliminary laryngotomy was done and the anesthetic given through the laryngeal tube. A knife was inserted behind the upper lip and all attachments of the soft parts to the palate were divided in a vertical direction up to the level of the orbits. The right side of the nose was freed and a flap turned up from the right cheek to form the right side of the nose after the scar had been excised. The apparatus was then inserted and the projection forced forward to bring the tissues into the proper position. Figures 123 and 124 were taken 3 weeks after this operation. A further operation was begun to repair the nose and make sockets to hold glass eyes but the skin was found to be of such an unhealthy character that all idea of further surgery was abandoned and the apparatus shown in figures 125 and 126 was made to cover the defects.

POSTOPERATIVE INFECTIONS.

A number of the patients develop erysipelas and pus infections after plastic operations. Sometimes this is due to faulty technic at the time of operation and at other times to later contamination. In some of the extensive operations such as rhinoplasties with flaps made from the forehead and scalp it is impossible to avoid breaks in the technic; also in operations about the eyelids, nose, and mouth absolute asepsis is impossible. Yet, when contamination must be so frequent, the number of infections is small and it is evident that the tissues must have a very high power of resistance. Iodine sterilization is the method usually employed and is preceded by ether if the skin is very greasy. When the operation involves bone or cartilage the special technic of bone surgery is observed and the skin and gloved hand are excluded from contact with the tissues as far as possible.

Erysipelas is frequently most baffling. It will appear in a ward and, in spite of all precautions, will spread from patient to patient. Cases coming to the ward from different operating rooms and operated on by different surgeons will develop erysipelas before the dressing has been touched by anyone in the ward. Some patients develop erysipelas after each operation. Fortunately it is mild in type and does not often interfere with the ultimate success of the operation.

METHODS OF ANESTHESIA.

Special methods of anesthesia are necessary in surgery of the face and jaws as the operator must invade the field usually held sacred to the anesthetist. The two main difficulties are to maintain a clear airway and to avoid interference with the aseptic field with the view of the surgeon. At the Queen's Hospital all the anesthetists are medical officers who do nothing but this work and have acquired remarkable skill in their specialty.

Capt. R. Wade has written an excellent description (*Lancet*, London, June 8, 1918, p. 794) of his methods, of which the following is a summary. He uses a preliminary hypodermic injection of 1/1 grain of atropin, given a half hour before operation. Anesthesia is always induced with chloroform and then a number of methods are available.

If the oral cavity is not involved in the operation, an airway is introduced and a small tube connects it with a Shipway ether and chloroform apparatus which may be operated by hand bulb, foot bellows, oxygen tank, or electric motor. With this apparatus one can give ether, chloroform, or a mixture of the two with or without oxygen. Should the mouth be the seat of the operation a nasal tube may be inserted and the fauces packed to exclude blood. The tube is connected to the Shipway apparatus and the anesthetic continued. Occasionally a preliminary laryngotomy or tracheotomy is found necessary and the tube from the Shipway apparatus is introduced through the wound.

In extensive and prolonged operations rectal anesthesia has been successfully employed in hundreds of cases. A saline aperient is given the morning of the day previous to operation and castor oil the same evening. The morning of operation the rectum is well washed out with a simple enema. A hypodermic of hyoscin 1/100 grain, morphin 1/4 grain and atropin 1/150 grain is given half an hour before the patient leaves the ward. He is taken to a quiet, dark room adjacent to the operating room and there the rectal injection is given. A mixture of ether 5 ounces, olive oil 2 ounces, and paraldehyde 2 drams is slightly warmed and allowed to run in slowly through a funnel and soft catheter. Operation is started about an hour later. If anesthesia is not deep enough a few drops of chloroform may be given but this is rarely necessary. When the patient is returned to the ward the rectum is washed out with warm water until no oil is seen and no ether smelled in the return. This method is not followed by vomiting or bad after effects.

It is frequently an advantage to have the patient in the sitting position during a part or the whole of the operation. For such cases a modified dental chair may be used for an operating table (figs.

11 and 12). Anesthesia is induced in the sitting position; the head is then bound firmly to the head rest; a rubber catheter is inserted through the nose or mouth, as required, and connected with the Shipway apparatus. Operations lasting 3 to 4 hours may be done in this position and less of the anesthetic is required than with the patient in the prone position. Oil-ether rectal anesthesia may also be used in the sitting position.

Capt. J. C. Clayton attaches to the nasal tube or airway a rubber tube having at its end a funnel with a 4-inch opening which is covered with a coarse cloth known as house flannel. Ether or chloroform may be dropped on this cloth or the tube from the Shipway apparatus may be inserted through a hole in it. The sound of the breathing is amplified by the funnel and provides sufficient indication of the patient's condition. The anesthetist can thus remain at a distance of several feet from the operating table and avoid interfering with the surgeon.

MILITARY ORTHOPEDIC HOSPITALS IN THE BRITISH ISLES.

By HAMMOND, Lieutenant, Medical Corps, United States Naval Reserve Force.

After completing my duty at United States Navy Base Hospital No. 6, located at United States Navy Base No. 6, Queenstown, Ireland, I requested permission to visit the various military orthopedic hospitals in the British Isles. This request was courteously granted by the force commander and I was ordered to London and attached to United States Navy headquarters with a roving commission. In this way I was permitted to visit the various orthopedic centers and to spend my time to the best advantage, giving as much or as little time to each particular center as I saw fit. The period of inspection covered a period of three months, and during this time I visited all the principal centers and most of the hospitals devoted to this work. I also visited several hospitals where special conditions are treated, and many civil orthopedic hospitals. At the time of my visit no cases of recent injury were under treatment. The hospitals had settled down to true reconstructive surgery and after treatment; the correction of deformities and the restoration of function.

I was everywhere received with the greatest courtesy and given every opportunity for studying the methods pursued, and for observing the results of treatment. I wish to take this opportunity of thanking all the medical officers at the various centers for their many kindnesses and their willingness to afford me every help. It was gratifying to hear the work of the American orthopedic surgeons who had been attached to these British hospitals so highly com-

mended and to realize that they had filled a very important niche at a time when every available British surgeon was necessarily employed at the front.

Number of beds and medical officers attached to British military orthopedic hospitals. (Fig. 1.)

Hospital.	Number of beds.	Commanding officer.	Registrar.	Radio.	Physiotherapy.	Physicians and neurologists.	Anesthetists.	Pathologists.	Surgeons.	Total staff each hospital.
Aberdeen.....	516	1	1	1	2	(1)	(1)	.....	5	1
Edinburgh.....	1,084	1	1	1	2	1	2	1	8	1
Glasgow.....	500	1	1	1	1	1	1	.....	5	1
Dublin.....	360	1	1	1	1	1	1	.....	5	1
Newcastle.....	346	1	1	1	1	1	1	.....	3	1
Leeds.....	1,739	1	1	1	3	2	2	1	17	2
Liverpool.....	1,552	1	1	1	2	2	2	1	16	2
Baschurch.....	200	(2)	(2)	(2)	(2)	(2)	(2)	(2)	2	1
Manchester.....	300	1	1	1	1	1	(2)	1	3	1
Cardiff.....	717	1	1	1	1	1	1	.....	7	13
Newport.....	500	1	1	1	1	1	1	.....	5	11
Birmingham.....	965	1	1	1	2	1	2	1	9	15
Cosham.....	200	1	1	1	1	1	1	.....	2	1
Oxford.....	699	1	1	1	1	1	1	.....	7	15
Bristol.....	730	1	1	1	1	1	1	.....	7	15
Reading.....	328	1	1	1	1	1	1	.....	3	1
Netley.....	1,030	1	1	1	2	1	2	.....	10	14
Edmonton.....	1,405	1	1	1	3	1	2	.....	14	15
Brighton.....	522	1	1	1	1	1	1	.....	5	15
Tooting.....	778	1	1	1	2	1	1	1	7	15
Shepherds Bush.....	1,486	1	1	1	3	2	2	1	15	26
Total.....	15,957	20	18	20	31	22	26	6	153	266

¹ From medical wards.

² Female staff.

³ Part time.

Number of centers, 21.

The present article is intended in no way to encroach upon the excellent and complete "Report on Medical and Surgical Developments of the War," by Lieut. Commander William Seaman Bainbridge, Medical Corps, United States Naval Reserve Force, published in the January, 1919, number of the **United States Naval Medical Bulletin**. It is hoped that it may supplement that article, and deal more at length with the problems and methods of reconstructive surgery as observed in the military orthopedic and allied hospitals.

The treatment of orthopedic cases is carried on in special military hospitals located in "centers" near important cities throughout the United Kingdom. Certain data regarding these 21 centers are given in the accompanying table (fig. 1). The hospitals are nearly all located in some preexisting institution such as an insane hospital, workhouse, or infirmary, which has been preempted by the Ministry of War. They are nearly all well adapted for their new purpose, and it was necessary to build only an operating pavilion and hutments for housing the electrical, hydropathic, massage, and gymnastic departments and the workshops. Many small institutions and private estates as well have been taken over, and are used as convalescent homes attached to the larger centers.

The inception and successful planning of the hospitals is due to the foresight and indefatigable energy of Maj. Gen. Sir Robert Jones. Already well known as one of the leading orthopedic surgeons of the world, he has further added to his laurels as a skillful organizer and a princely leader of men.

Treatment of the disabled soldier is carried out in a similar manner in all the centers. The accumulated experience of many surgeons in the treatment of war injuries for five years has resulted in certain procedures becoming standardized. At the same time no restriction is placed on individual initiative. In every hospital certain problems have appealed to some workers more than others, and these operations or methods of treatment are naturally featured. For this reason it was considered advisable to make a complete tour of the various centers rather than to confine the observation to a study of the work at any one hospital or with one group of surgeons. Some of the best work was seen at hospitals which are least often visited. All the institutions pursue the same line of after treatment by means of whirlpool baths, electricity, massage, gymnastic exercises, and workshops.

An attempt was made to find out the total number of orthopedic cases. The classification of orthopedic conditions is a puzzling one. The statistical department of the Royal Army Medical Corps very kindly furnished figures and at the same time made the suggestion that fully 90 per cent of the wounded might be regarded as orthopedic. Up to May 15, 1919, there had been reported to England 62,892 officers and 1,207,517 men, making a total of 1,270,409 wounded. Of this number, 1,143,368 (90 per cent) may be regarded as a fair estimate and gives an idea of the tremendous problem with which Great Britain is struggling.

It may be surprising to learn that 90 per cent of the wounded could be classified as orthopedic cases. In England all permanent injuries to the extremities are regarded as orthopedic and it must be remembered that many abdominal and head injuries are quickly fatal, while injuries to the limbs leave the man with his life but crippled.

Injuries of the face and jaw, fractures of the spine and skull, and certain other special conditions are treated in special hospitals. The limbless are treated in special institutions. Nearly every civilian hospital has a certain number of cases under treatment all the time, but the great majority of the orthopedic conditions are treated in 22 of the 21 centers. Many pensioners and discharged soldiers are undergoing treatment at the hospitals as out-patients, so that the number at any one center is really much larger than shown in the table in figure 1.

The medical staff in each center is well organized. The commanding officer and registrar attend to the routine management of the hospital. The surgical work is under the care of a surgeon of special training in orthopedic surgery. In the larger centers the work may be divided between two such surgeons. The junior surgeons are organized in teams or "firms," and have charge of the wards and carry on the routine work of the hospital. Each surgeon operates according to his ability, and if he develops an aptitude for a certain line of surgery he is often assigned to the treatment of such cases. Puzzling or interesting cases are brought to the attention of the chief surgeon whenever necessary or at a weekly conference. In some of the hospitals there is a weekly "stand-to," at which every case is thoroughly examined by the ward surgeon, often in consultation with a colleague from some other department.

Each hospital has well-equipped and adequately staffed electrical, massage, hydropathic, and gymnastic departments and workshops. The work of these departments will be discussed later on.

Cooperation between surgeons and the physicians and staffs of the other departments is characteristic of every center. The patient is often brought before the heads of the various departments and after an examination is made by each specialist and all clinical and laboratory findings have been assembled, treatment is outlined from the consensus of opinions.

The surgery is of a high order of excellence everywhere and the associated departments are under the charge of physicians of sound training and wide experience in their particular lines. The result of this happy combination is that the most crippling deformities which the surgeons of Great Britain have ever been called upon to treat are being corrected in a manner highly creditable to the best ideals of orthopedic surgery.

Before the wounded are returned to England it is understood that they have received treatment at field dressing stations, casualty clearing stations, evacuation hospitals, and base hospitals. Those cases which require orthopedic treatment are transferred to one of the centers in the British Isles, usually as near the patient's home as possible.

PRINCIPLES OF RECONSTRUCTIVE SURGERY.

The treatment of war injuries is much more complex than that required by those encountered in civil life. The wounds themselves are more serious and more likely to become infected. In addition there is a severe physical and mental strain in modern warfare which has left its mark on soldier and civilian alike, but more noticeable, of course, in the case of the soldier. The tediousness of recovery in cases of severe injury, necessitating months in a hospital with the added mental strain, militates against speedy convalescence.

The wounds themselves are complicated and involve all of the tissues. Extensive scars, often unhealthy or adherent to underlying parts, are found. Muscles may be severed, paralyzed, or destroyed. Tendons may be divided or adherent. Nerve injuries ranging from simple contusion to loss of several inches of the nerve trunk are common. Bones may be malunited, or ununited, and joints may be fixed and useless, or stiff and painful.

The principles of treatment are to restore the functional use of the injured part in the quickest possible time. It is of great value to the surgeon if he can follow through the treatment of these cases and witness the final results obtained.

The procedures of orthopedic surgery as laid down by Elmslie¹ are:

1. The repair by surgical means of the damaged part, as far as possible. This repair includes the suture of the skin, excision of scars, suture and repair of nerves, muscles, and tendons, restoration of continuity in bones in good alignment, and such surgical treatment of joints as will secure stability and mobility.

2. The replacement of functions which are definitely lost by the use of the remaining healthy parts by such means as tendon grafting, tenodesis, and fixation of joints.

3. The restoration of function by methods of physiotherapy, including treatment by massage, movements, baths, and by gymnastic education, and including also the actual functional use of the limb in the course of active work (workshops).

4. The replacement of function by the fitting of an appliance such as an artificial limb.

The surgeon must himself follow and assist in all these methods of treatment, and should on no account confine himself to the operative side of the work. If he is to advise upon and carry out amputations to the best advantage for the patient, he must himself be conversant with the fitting of the artificial limb. If he transplants a tendon, he should himself supervise the subsequent reeducation."

In reviewing the work of the British military orthopedic hospitals an attempt will be made to discuss the condition and the treatment at some length. The salient points in connection with each subject will be taken up, and any new knowledge concerning it recorded. Conditions in which practically all the knowledge is new, such as the repair of nerve injuries, will be considered at some length.

It is only recently that time enough has elapsed so that the results of certain treatment and operative procedures can be realized and general rules for guidance formulated.

¹ Elmslie, R. C., *The After Treatment of Wounds and Injuries*. London, J. and A. Churchill, 1919.

The illustrations accompanying this article have been kindly furnished and permission to publish accorded by the surgeons of various hospitals. Due credit and hearty thanks are hereby given them.

CHRONIC TRAUMATIC OSTEOMYELITIS.

This condition is the bugbear of war surgery and is well nigh omnipresent. Practically every wound involving bone or other deep structures has suppurated during its treatment. Until the septic process has been eradicated no operation for the repair of nerves, tendons, muscle, or bone may be undertaken without the danger of an exacerbation of the inflammatory process. Even massage and manipulations of joints may provoke a cellulitis and further adhesions in an already badly damaged limb. For this reason, massage and manipulations are often prescribed for a few weeks before undertaking a proposed operation. If there is no lighting up of a septic process from this treatment it is probably safe to operate.

Scars.—Many war wounds present large adherent scars of low vitality with loss of substance beneath. Any operation which affects the nutrition of the scar may endanger the structures under the scar.

Sequestra.—Small sequestra and minute quantities of pus may remain deep in a bone ready to break forth at the slightest provocation. The formation of new bone which goes with the repair of bone necrosis forms a rigid wall through which the sequestra can not escape, and consequently it is better, wherever possible, to remove the sequestra by a radical operation.

Investigation of the sinus.—The sinus should be investigated (1) as to the presence of definite sequestra, (2) as to the character of the cavity walls, whether they are so rigid that they can not fall in and so close the cavity, and (3) as to the presence of foreign bodies, such as metal, cloth, ligatures, or paste.

X-ray examination.—This is of the greatest assistance in determining the presence of sequestra and the relation of bone fragments and the presence of cavities in bone. Plates should be taken in two planes at right angles to each other, or stereoscopic roentgenograms may be made either with a probe in the sinus or with the cavity injected with bismuth paste. The shadow of a sequestrum is usually denser than that of normal bone.

Operation on a chronic sinus.—This should be as thorough and radical as conditions will permit. It is well to prepare for a long operation, and, if possible, a tourniquet should be employed. If the sinus is due to a foreign body or does not reach to the bone, it may be opened up, curetted, and allowed to granulate.



Fig. 2.—Treatment of fracture of the middle and lower third of the femur (Sinclair method showing Thomas splint bent at the knee, Balkan frame and body-weight extension.

71-1

The radical operation.—If the sinus leads to bone, a radical operation should be performed. The bone is approached by a long incision from the side, which gives the best exposure, not necessarily at the location of the sinus. The femur is always approached from the outer side. Scar tissue and as much of the sinus as possible are excised. The periosteum is stripped back from the entire circumference of the bone, beginning at healthy bone above and below the seat of disease and working toward the latter.

Every sinus track and bone cavity is thoroughly explored. The outer wall of such a cavity is chiseled away and the edges beveled down from above until the floor of the cavity is as flat as possible. All depressions must be removed. The soft structures, particularly the muscles, can thus fall into the cavity and help to obliterate it. It may be necessary to cut a flap of muscle so that it can fall into the cavity in the bone. It is a good thing to keep a layer of periosteum on the deep surface of the muscle flap to assist in the formation of new bone. The skin is freed up by undercutting the edges, the wound swabbed with alcohol and dried; B I P P is rubbed into the wound, which is then sutured with drainage. The dressing is left in place from two to eight days. In most cases the wound heals by first intention, except at the site of the tube. The sinus persists for a month or two. If it persists more than three months a further operation will probably be necessary. The cause of the persistence will usually be found in a small sequestrum or in a previously unobliterated cavity.

TREATMENT OF FRACTURES.

The treatment of fractures in the allied armies has been carried out on uniform lines. The principle is the same whether the fracture is in the arm or in the leg, but since fractures of the femur have been the most frequent and among the most difficult of all fractures to control, a description of the treatment of femoral fractures will be given.

Principles of treatment.—The object of the treatment in all fractures is: (1) Reduction of deformity with correct alignment; (2) prevention of recurrence of deformity by correct splintage until union is firm.

Essentials of a splint.—It must furnish (1) fixation; (2) extension and counter extension.

Splint.—This is a modification of the Hodgen splint with the Thomas knee splint and the Balkan frame. There are two distinct modifications of this principle in use in British military hospitals, the methods of Sinclair and of Pearson.

Sinclair applies extension to the leg by zinc oxide plaster straps or by straps of flannel affixed with glue, and ties the end of the splint to the Balkan upright at the foot of the bed. Counter extension is secured by the body weight and by elevating the foot of the bed. Thus the splint and the leg are pulled together in this method, the true extension coming from the straps on the leg and the splint serving as a supporting structure.

Pearson uses the tuberosity of the ischium as the point of counter extension by fixing the ring of the Thomas splint firmly against it. The other end is tied firmly to the upright at the foot of the bed. To secure extension, calipers, to which weights are attached, are applied directly to the condyles of the femur.

SINCLAIR'S METHOD.

Splint.—The leg is fixed in a Thomas splint bent at the knee to an angle of 20° . The leg is extended by zinc oxide plaster straps or by straps applied with glue, and tied to the end of the splint. It is supported by a series of flannel slings attached to the lateral bar of the splint. Extension is produced by tying the end of the splint to the Balkan upright. Counterextension is produced by the body weight, the foot of the bed being raised 1 foot.

Suspension of leg.—The leg in the splint is suspended to the Balkan frame by four cords (fig. 2), two attached to each bar at the ring and two near the end of the splint. The cords pass through pulleys in the horizontal bar over the bed and up to the head of the bed. A weight of 5 pounds is used for the cords at the end of the splint and 8 pounds for the cords attached to the ring.

Foot.—The foot is suspended (fig. 3) by gauze glued to the skin and slung to an iron gallows foot piece placed 2 inches above the malleoli. In fractures of the lower third of the leg extension is obtained by Sinclair's foot piece (skate), which is glued to the sole of the foot by narrow strips of flannel (fig. 4).

Glue.—The glue used by Sinclair has the following composition:

	Parts.
Glue	50
Water	50
Glycerin	2
Calcium chloride	1
Thymol	1

Three or four fracture boards 8 inches wide are placed under the mattress. No bolster is permitted under the shoulders and only a small pillow under the head.

In applying extension, pads of wool or sheet cotton should be placed over the tibia and tendo Achillis before the extension is

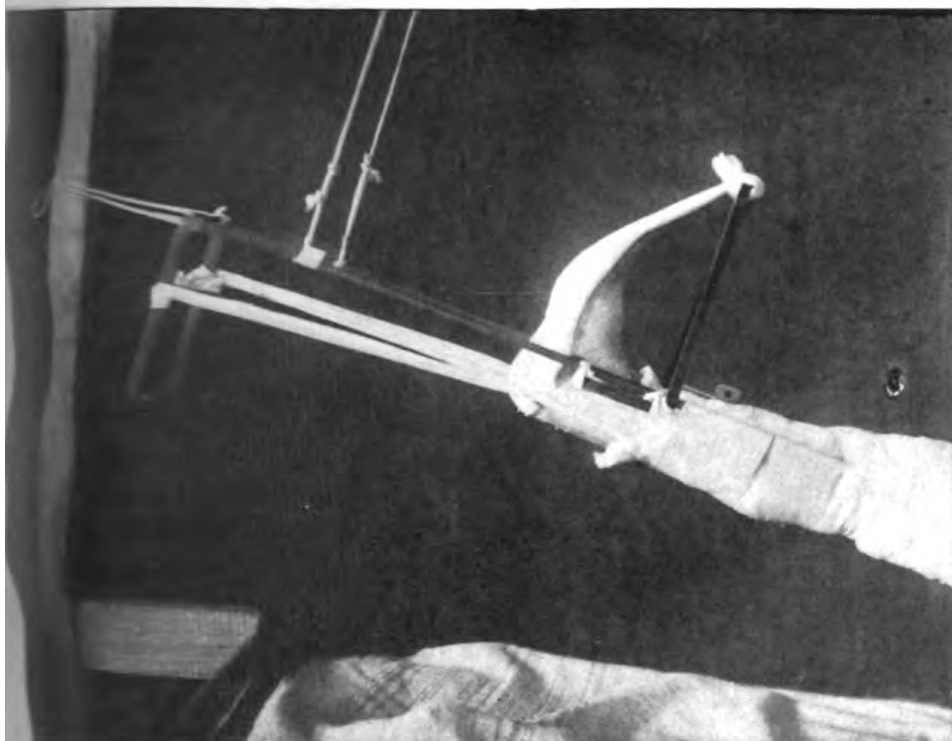


Fig. 3—Treatment of fracture of the femur (Sinclair method), showing position of foot and method of dorsiflexion by gauze strip glued to the sole of the foot.

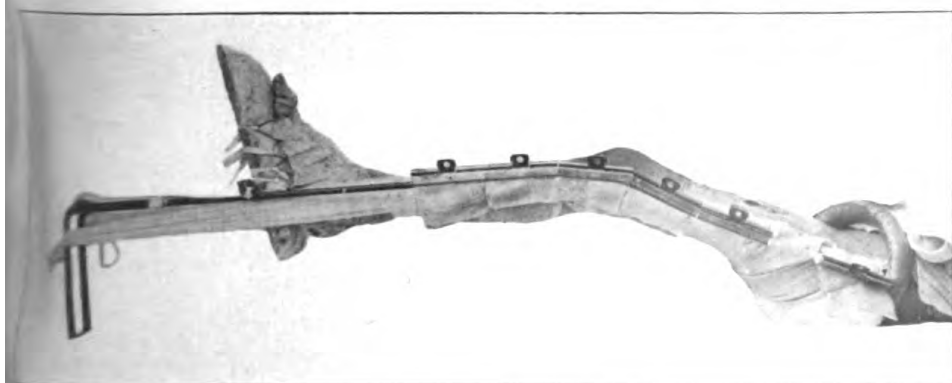


Fig. 4—Treatment of fracture of the leg, showing Sinclair skate in position. Narrow strips of material are glued to the sole of the foot which is then tied to the skate by pieces of tape.

72-1

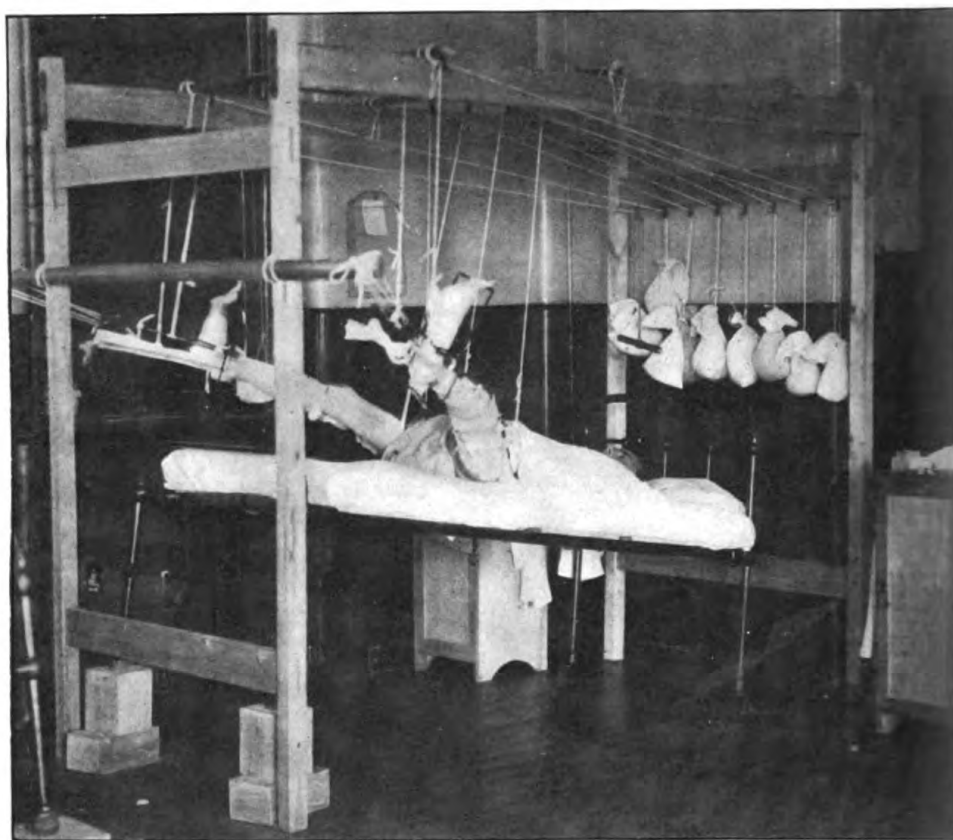


Fig. 5.—Treatment of fracture of the upper third of the femur (Sinclair method). Two Tho splints in abduction with body-weight extension.



Fig. 8.—Method of bending knee over pillow to gain movement after fracture of the fem

72-2

Applied. The extension should be cut out over the head of the fibula and a band should be placed around the thigh.¹

The Thomas splint is bent at the knee. (1) It enables the lower fragment to be pushed forward into position by the supporting cord when the extension is in force. (2) It is a position of ease for the knee. (3) It releases the gastrocnemius and so lessens the pressure on the lower fragment. In fractures involving the knee joint where ankylosis is probable, a straight splint is used.

The leg is suspended to a Balkan frame for several reasons: (1) The pull of the cords keeps the ring in apposition to the thigh; (2) the comfort of the patient; (3) the ease of nursing; and (4) the ease of dressing.

If skin extension can not be used, the same force may be applied by means of calipers through the condyles of the femur, or by screws $1\frac{1}{2}$ inches long placed in holes drilled into the anterior surface of the tibia at the junction of the upper and middle third.

Fractures of upper third.—In dealing with fractures of the upper third or upper fourth of the femur it is necessary to abduct both thighs as far as possible and apply a double Thomas splint and a double Balkan frame. (Fig. 5.) These fractures are liable to show malunion under the best conditions.

Sinclair's net bed.—This is used in certain complicated pelvic fractures where dressing of wounds and nursing would be impossible if the patient were lying on a bed. It is difficult to describe and difficult to photograph. (Fig. 6.) The patient is really suspended from a framework, the legs being slung from timbers above, and the body part resting on a net or hammock attached to a frame.

Removal of splint.—The leg is removed from the splint: (1) When the X-ray appearances show density and lamination of callus. This usually occurs at about the end of six weeks. (2) When tenderness on pressure over the callus is gone. (3) When clinically there is firm union.

X-ray.—The method of using the X-ray is as follows: Stereogramenograms are made of fractures in the upper third of the femur; anteroposterior and lateral views for the rest of the bone. (1) Examination is made on admission to determine the type of fracture; (2) after putting up the fracture; (3) every three weeks until the splint is removed; (4) one week later to detect if any bending of the callus has taken place; (5) one week after the walking caliper splint has been applied; and (6) before the caliper splint is discarded.

¹I am indebted to Capt. John Padwick, R. A. M. C., of the Military Orthopedic Hospital at Shepherd's Bush, London, for the description of the Sinclair method and for the illustrations accompanying it.

Walking caliper splint.—The walking caliper splint is fitted 1 days to 2 weeks after the removal of the splint. (Fig. 7.) It is worn from one to nine months, the time varying according to the position of the fracture, the quantity and density of the callus, the faulty apposition of the fragments, and the age of the patient. Faulty apposition requires a much longer time for consolidation of callus. Patients over 40 are found to be slower in forming callus.

Knee stiffness.—One of the unfortunate complications of femoral fractures is stiffness of the knee which seriously delays convalescence. It is due to intra-articular adhesions, to fibrosis of the quadriceps, and in a certain proportion of cases to sepsis. It is treated by faradization of the quadriceps for 15 minutes daily as soon as the edema subsides, or the condition of the wounds permit. Motion may also be restored by bending the knee over a pillow while in bed (fig. 8) and by flexing the knee by means of a bandage tied to the leg just above the ankle and passed under the bed and back over the shoulder. (Fig. 9.)

PEARSON'S (EDMONTON) METHOD.

Splint.—As stated above, Pearson applies the true Thomas principle, by fixing the ring of the Thomas splint firmly against the tuberosity of the ischium as the point of counterextension. The other end of the splint is tied firmly to the upright at the foot of the bed. Extension is made by calipers applied directly to the bone, just above the adductor tubercle and the external condyle. A weight of 5 pounds in compound cases and of 15 pounds in simple cases is applied to the calipers. In rare instances it may be necessary to use adhesive plaster extension.

Pearson bed.—A special bed (fig. 10) has been devised by Pearson for treating these cases. The bed is of iron with adjustable uprights for slinging the leg or arm at any angle. The foot of the bed can be raised to any convenient height. Canvas sections replace the spring of the ordinary bed and the mattress is made in sections. The middle canvas section has a quick release device by which this section may be lowered, the mattress section removed, and bed pan inserted or Roentgen-ray examination made at the bedside without disturbing the patient.

Application of calipers.—In applying the calipers a longitudinal incision three-fourths inch long is made under gas anesthesia on either side of the thigh opposite the adductor tubercle and the external condyle of the femur. The calipers are inserted into the periosteum only and by a screw adjustment are prevented from penetrating deeper than one-fourth inch. (Fig. 11.) The three-fourths-inch incision is better than the simple puncture of the skin because there is less pain. Pain is caused by the pull of the calipers on the skin, which is elimi-

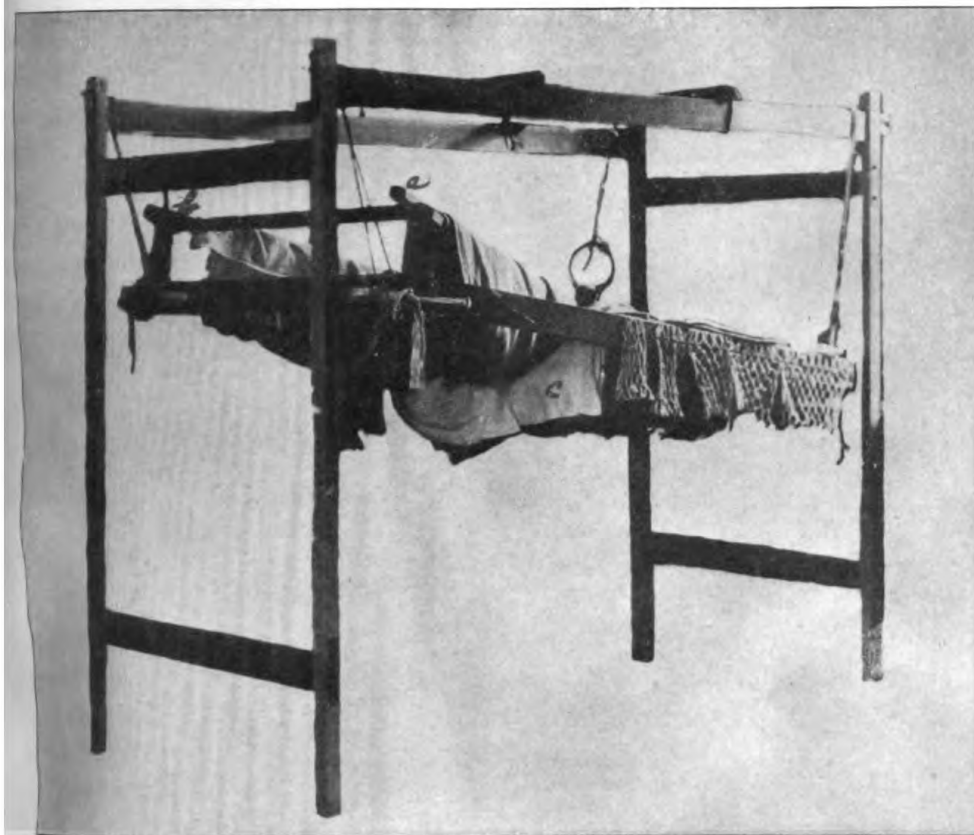


Fig. 6.—Sinclair's net bed. The patient lies in a wooden frame suspended in a Balkan frame. The body rests on a hammock or net seen at the right. The legs are slung from two horizontal wooden bars *a* and *b*. A pillow *c* is placed under the pelvis.

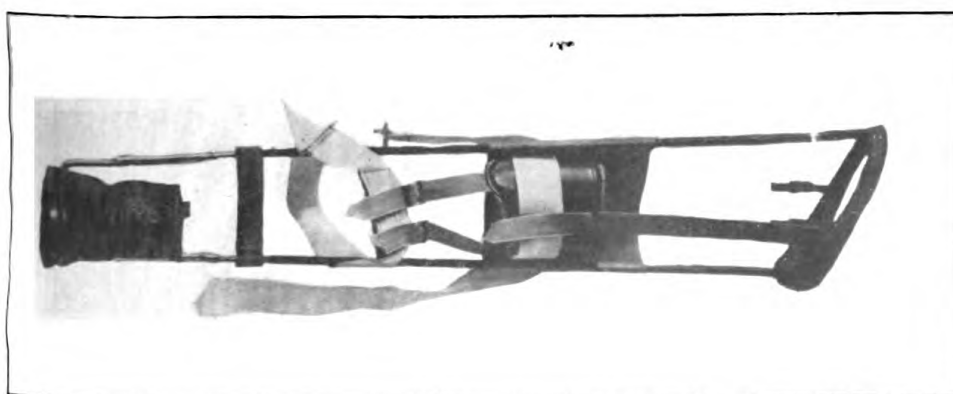


Fig. 7.—Walking caliper splint. The weight is borne on the ring which fits the groin, and the sole of the foot does not quite touch the sole of the boot.

74-1

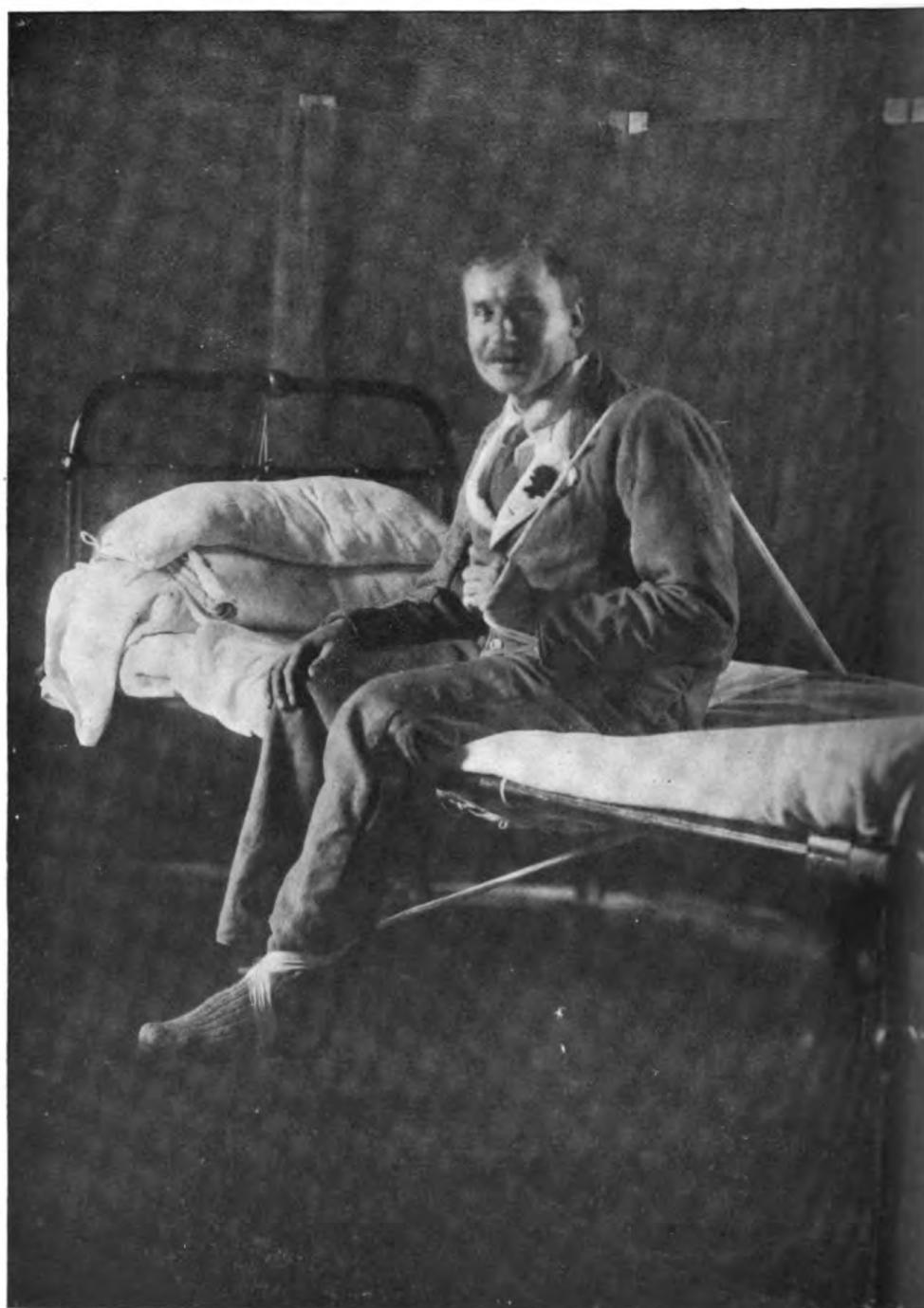


Fig. 9.—Method of accelerating knee bending after fracture of femur.

74-2

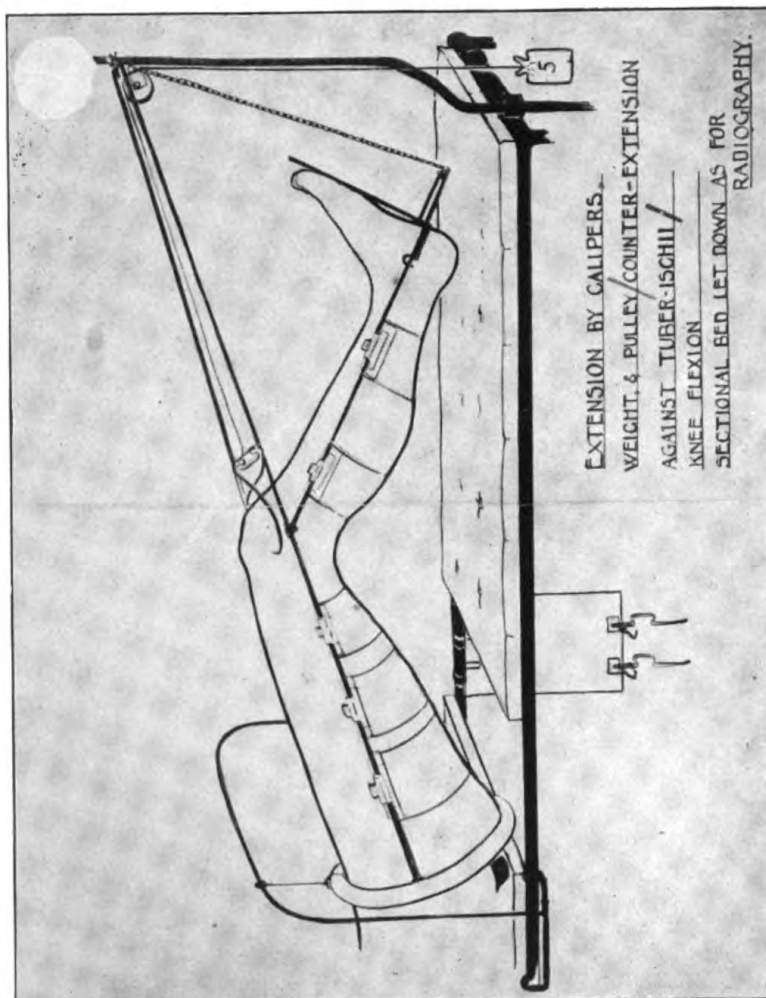
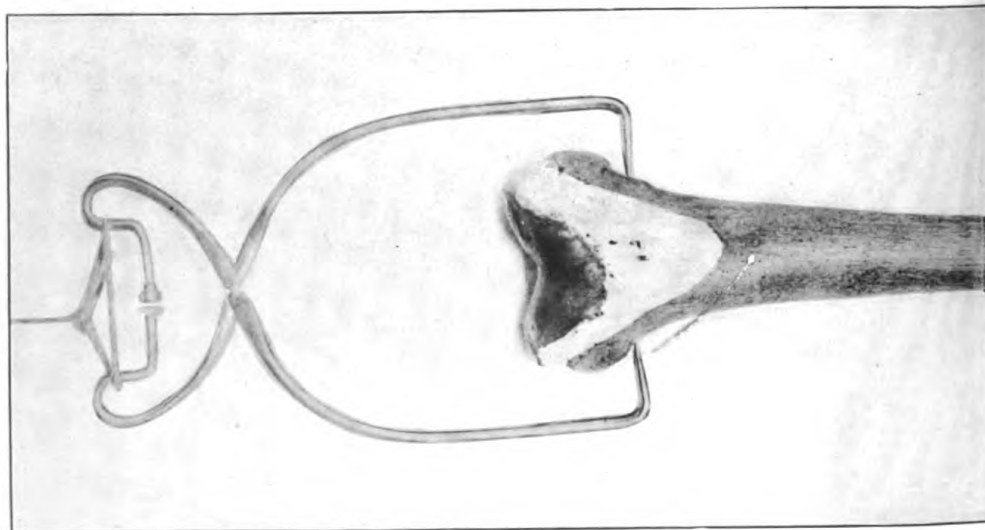


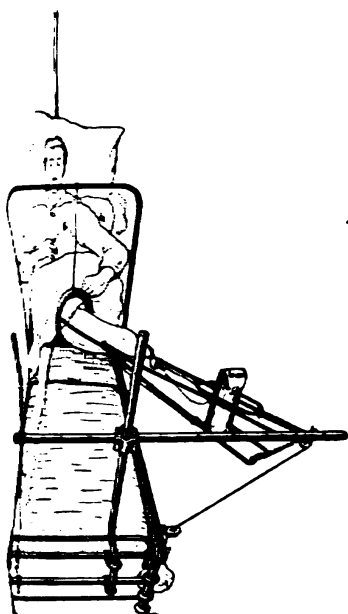
Fig. 12.—From "Fractured Femurs, Their Treatment by Caliper Extension," by Maurice G. Pearson and J. Drummond. Oxford University Press, 1919. By permission.

by the longer incision. If pain is present it is usually relieved by iodoform powder sprinkled over the skin edges. Mild sepsis occurs in 2 per cent of the cases, but has never been known to last over a few days and no case of extension to the knee joint has been reported.

Movements.—The Thomas splint is jointed at the knee, which permits movement of the knee joint through a varying arc without disturbing the mechanics of the fracture. The leg is moved at a different angle with the thigh each day, until at the end of 10 days the cycle is completed and the leg is back at the starting point. The cycle is now begun again. The point of flexion of the knee is somewhat lower than that used by Sinclair and Padwick.

Very few stiff knees result from this treatment because of the daily motion. A stiff knee is regarded by many surgeons as but slightly better than an artificial one. (Fig. 13.)

Accessories of the splint.—Side pressure pads of special design are used to control lateral mobility of the fragments. The ring of the splint is large and is suspended by a cord to a crossbar fixed over the bed at the level of the pelvis. (Fig. 10.) This device prevents the patient from raising his leg from the ring when he tries to sit up. A special rule has been devised by Pearson for measuring the lengths of normal and frac-



Treatment of femur fracture on Pearson fracture bed.¹

tured femora. When union has been obtained the calipers are removed and adhesive plaster fixation without traction is used until the bone is firm enough to permit the use of the walking caliper splint. *Fractures of the upper third.*—In upper third and upper fourth femoral fractures Pearson finds that abduction in elevation of only 30° is necessary. When operative fixation is necessary, he prefers plates to bone grafts.

Examination.—Stereoscopic anteroposterior examinations only are made the first week or 10 days until the position is satisfactory. Examinations are made with a portable apparatus at the bedside with the tube

¹ "Fractured Femurs, Their Treatment by Caliper Extension," by M. G. Pearson and Hammond. Oxford University Press, 1919. Diagram reproduced by permission.

below and the plate above and positive reductions of the stereoscopic negatives are hung at the head of the bed with the history chart and the "shortening" chart. (Fig. 15.)

Advantages of the caliper method.—(1) Better mechanical pull on the femur and less weight necessary. (2) Calipers do not stick as does adhesive plaster unless the caliper points have rusted from disintegration. This can be avoided by foresight. (3) Calipers

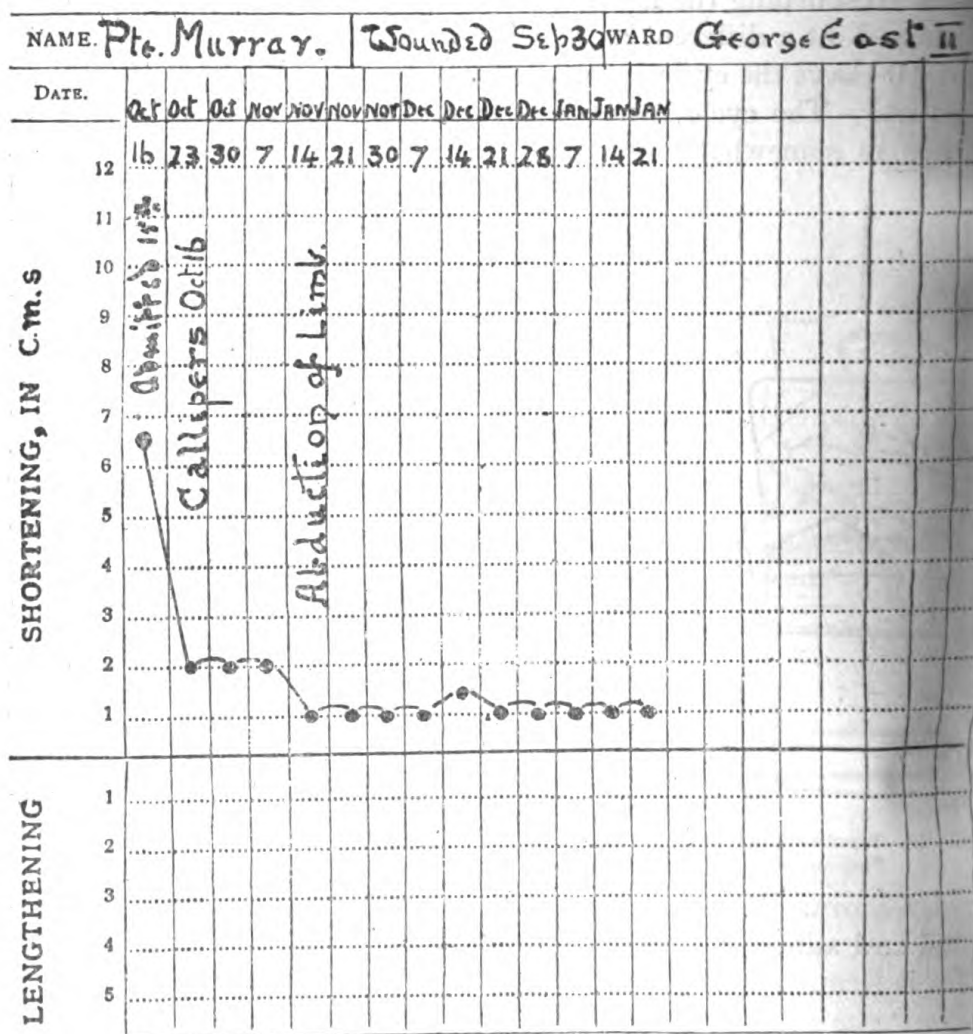


FIG. 15.—"Shortening" chart for fracture of femur. From "Fractured Femurs, Their Treatment by Caliper Extension," by Maurice G. Pearson and J. Drummond. Oxford University Press, 1919. By permission.

not stretch the lateral and crucial ligaments of the knee joint which is thought to be a fruitful source of knee stiffness. (4) The leg is left bare for massage, electrical treatment, etc. (5) Daily motion of the knee is permitted.

Disadvantages.—(1) Sepsis of mild degree in one quarter of the cases; (2) pain, which is probably slightly greater than with the Sinclair method.

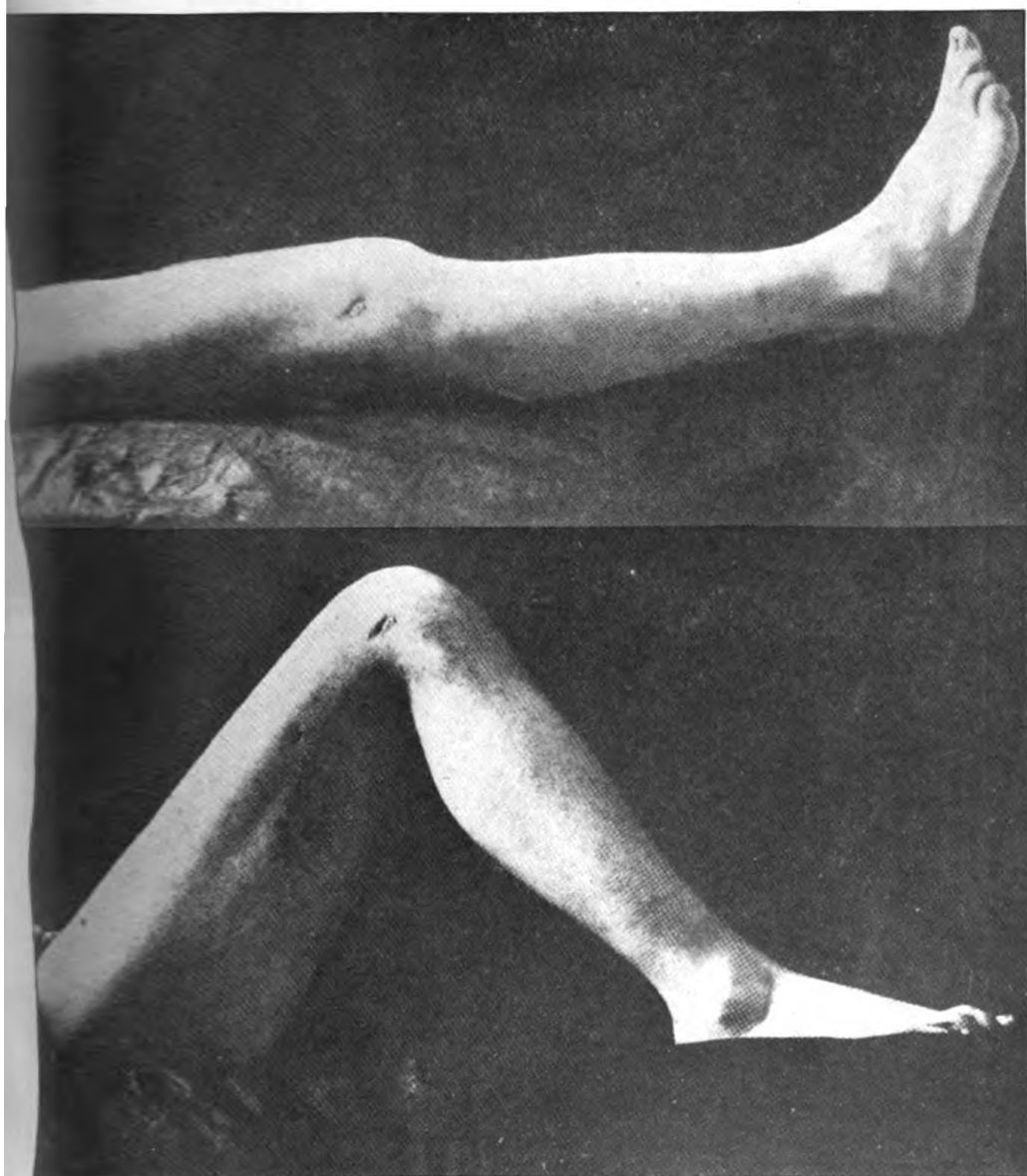


Fig. 13.—Compound fracture of lower third of femur three days after leg was removed from splint and four months after injury. Note flexibility of knee, good condition of muscles, and site of incision for calipers.
(From "Fractured Femurs, Their Treatment by Caliper Extension," by M. G. Pearson and J. Drummond. Oxford University Press, 1919. By permission.)

76-1



Fig. 16.—Fracture of femur below great trochanter. Condition on admission to **Second Birmingham War Hospital**, February 11, 1918.

76-2



Fig. 17.—Same as figure 16, showing gradual correction and formation of callus.

76-3

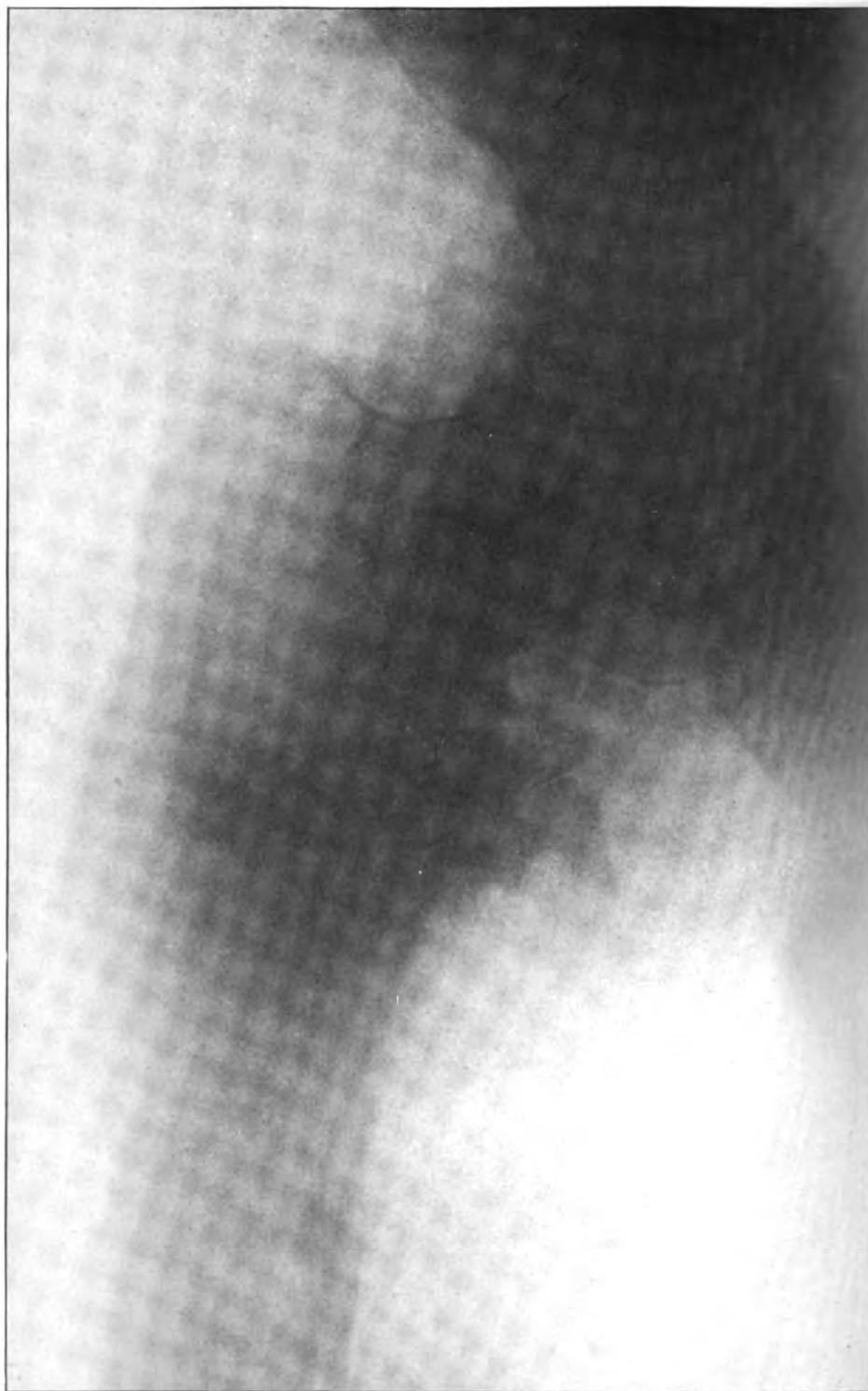


Fig. 18.—Same as figure 16, showing further straightening and bone formation.

76-4



Fig. 19.—Same as figure 16. Condition May 13, 1919. Position good, union solid.

76-5

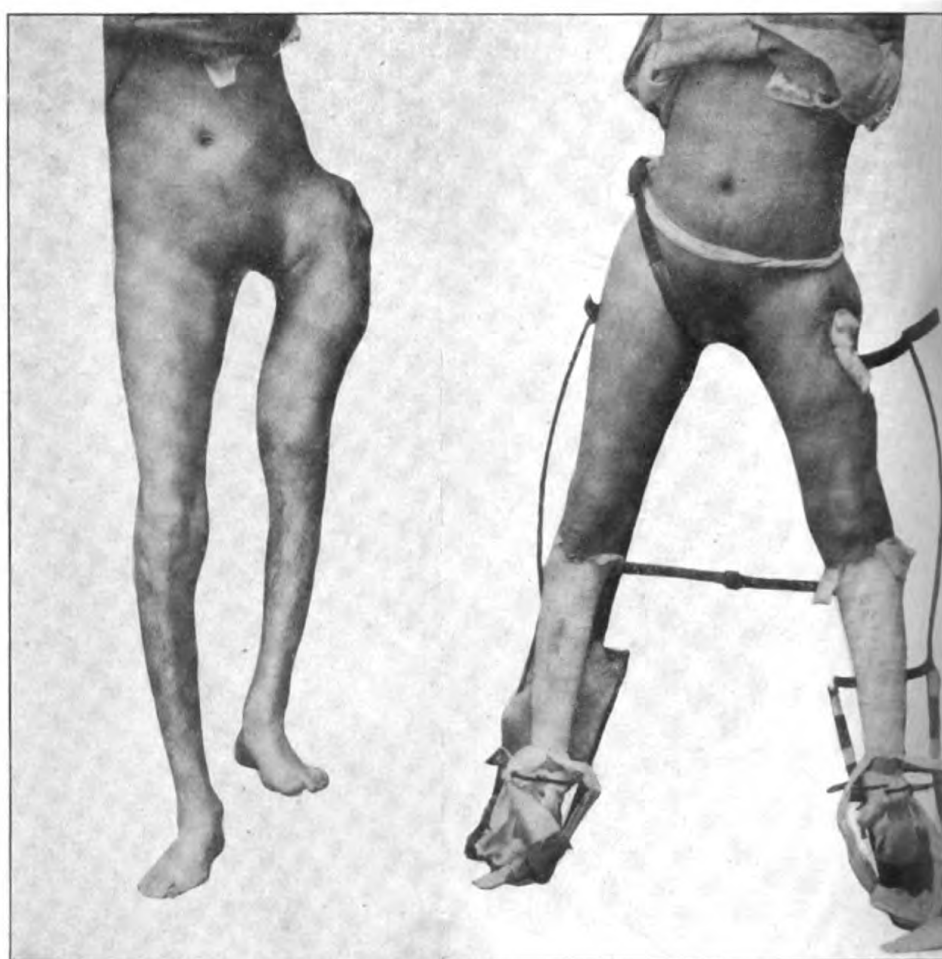


Fig. 20.—Same as figure 16. Condition on admission February 11, 1918.
 Fig. 21.—Same as figure 20. Position in abduction frame.

76-6

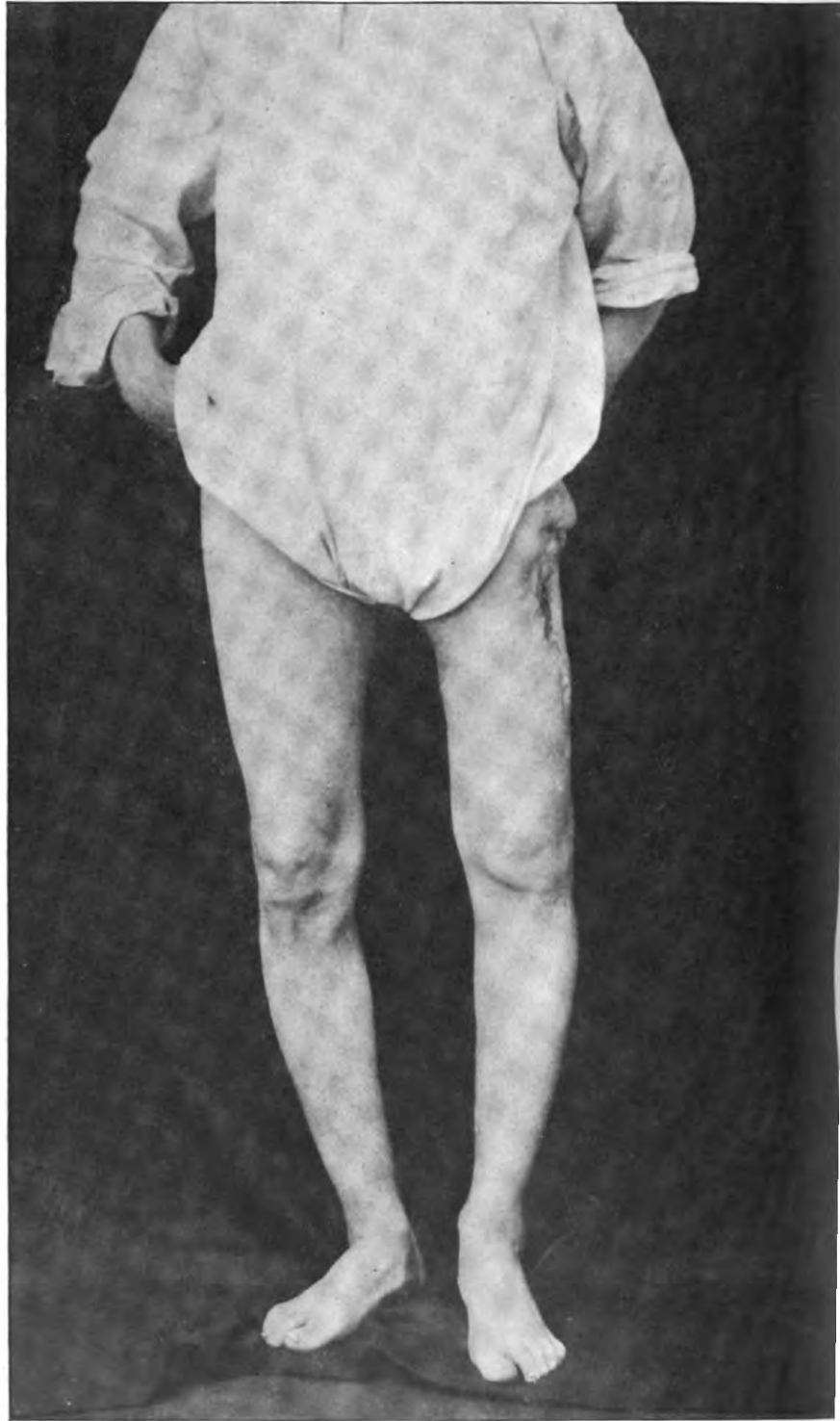


Fig. 22.—Same as figure 20. Final result May 13, 1919.

77-1

Results.—Results based on observation of 68 cases:

Average period from receipt of injury to final discharge, 29 weeks.

Shortening, 39 cases.

Loss of 1 centimeter, 5 cases.

Average shortening of $1\frac{1}{2}$ centimeters, 29 cases.

Extension over 90° , in 55 cases; from 60° to 90° , in 11; from 0° to 60° , in 2.

Figs 17-22 illustrate the condition and management of a comminuted fracture of the upper fourth of the femur. (From the Second Canadian War Hospital, service of Maj. Naughton Dunn, R.A.M.C.)

MALUNION OF FRACTURES.

Angular displacements of fragments.—This usually results in shortening of the limb. This may be of no practical importance as to the strength of the limb is concerned, especially in the upper extremity. In the lower extremity it may be of great importance. A fracture which has resulted in a sound, serviceable limb may be left alone, unless there be marked angular dis-

Displacement of fragments.—This may be of great importance in movements. Angulation of the humerus forward or backward may interfere with flexion or extension of the elbow; angulation sideways may disturb the carrying angle. Angulation of the humerus backward may give apparent hyperextension of the elbow. Angulation of the femur sideways may give varum or genu valgum which strain the joint and interfere with walking.

Displacement of fragments.—This is most common in the radius where the fracture has been treated in pronation instead of in supination, and full supination of the forearm is impossible. Another example is outward rotation of the lower leg in fracture of the tibia.

Treatment.—Malunion of fractures is generally treated by the osteotomies of surgery. Thus a fracture of the neck of the femur with eversion can be corrected by a transtrochanteric osteotomy (Jones); deformities at the knee by supracondylar osteotomy of the femur (Macewen), and outward rotation of the lower leg by simple osteotomy of the shaft of the tibia. In comminuted fractures, such as Pott's fracture, it is often advisable to resect the original fracture and correct the deformity at that point.

DELAYED UNION AND NONUNION OF FRACTURES.

Delayed union is due to loss of bony substance, especially periosteum, and to sepsis. While delayed union is common, nonunion is comparatively rare and is found most often in the humerus. Next in order of frequency are the radius, ulna, tibia and fibula.

Treatment.—After sepsis has been eliminated the bone ends should be approximated and held in place by an appliance such as a plaster leather splint. Passive congestion by a rubber bandage *above and below* the fracture should be employed. If these measures fail, an operation should be performed, the ends freshened and held together by absorbable or nonabsorbable ligatures, plates, or bone grafts. Usually the simpler operation of freshening the ends and approximating them by ligatures will be employed before resorting to a plate or bone graft.

BONE GRAFTING.

The art of bone grafting, which was elaborated by Albee many years before the war, has proved of inestimable value in cases in which a portion of the shaft of a bone has been carried away by gunshot accident or by infection and osteomyelitis, and in cases of ununited and malunited fractures.

The principles of bone grafting are now well established on a sound physiological basis and need not be reviewed here. It is sufficient to say that it is the only procedure which can restore the continuity of the shaft of a long bone in which several inches of bone have been lost. It is considered the best procedure in cases of ununited fractures of the shaft of long bones, and is thought by many surgeons of experience to be preferable to the plating of bones in fresh fractures.

The operation of bone grafting aims to supply a medium by which new bone will be laid down between the ends of two fragments. The graft probably acts merely as a scaffold across which the osteoblasts build a new bone bridge. It is advisable but not necessary that three layers of normal bone—periosteum, cortex, and endosteum—shall be used and that each layer shall be approximated to its original kind. The graft should be imbedded if possible into healthy bone 2 or 3 inches on each side in order to get a healthy blood supply and to obtain firmer fixation. Inlay, lateral, and intramedullary grafts have all been successful, although the last is based on theoretical and unphysiological principles. On the whole the best results are attained from the graft taken from the crest of the tibia, especially if strength be desired. The sliding graft is also in common use. The fibular graft, easier than the tibial graft, avoids operating on another part of

and gives good results provided the bone from which it is taken is well nourished. In a case of long-standing sepsis, where the parts are poorly nourished and the bone may be assumed to share in the impoverishment, it is better to take the graft from the crest of the ilium. The crest of the ilium may be used if a particularly strong bone be desired.

Preparation of bone grafting.—Let us assume that a 2-inch gap exists in the shaft of the radius, that a condition of sepsis has existed but has been quiescent for six to nine months, and that massage and stimulative treatment has been given for a period of two weeks without causing any lighting up of sepsis or pain. The bone may then be considered ready for grafting.

A study of the arm and the X-ray plates, the site of the incision and the type of operation is planned. A longitudinal incision of ample length is made over the radius, either on the palmar, or dorsal or external surface of the forearm, according to which surface is easier of access. The muscles are retracted, the periosteum over the ends is divided and carefully elevated and retracted. The ends are freshened or sawn off until healthy bone is seen. A groove is now made on the side of one fragment, into which one end of the graft may lie. The end of the other fragment is prepared in a similar manner, unless it is determined to insert the graft into the secondary end of the second fragment. In this case the medulla is completely reamed out with a reamer or large bone curette.

The arm is now covered with hot saline towels. The leg is exposed and a long, curved incision made over the crest of the tibia. The length of the graft, previously determined by accurate measurement with an instrument or calipers, is marked out by incisions in the periosteum. The shape of the graft is then marked out. With a hand saw a cut is made into the medulla of the tibia, first using the hand saws for the longitudinal cuts and the single saw for cutting the ends of the graft. If the saw has been well applied, the graft can now be removed by prying it gently with a periosteum elevator and by severing with a knife any shreds of periosteum which remain. The graft is wrapped in a hot saline towel and put in a place where it will not be lost or thrown away. The leg incision is closed. The graft is then fitted into the grooves prepared in the fragments of the radius. It will probably need to be held in place with bone forceps and molded somewhat to fit its new bed. The forearm, which has inclined to pronation during the months in which it has lacked the support of a radius, will probably need considerable manipulation to restore supination.

The bone ends and the graft ends are now pierced with a bone drill, and a heavy chromic gut or kangaroo tendon is passed through the holes

in the bone and graft and securely tied. In case the inlay graft the host bone only is drilled and the suture is passed up over the graft. When the suture is tied it serves to press the graft firmly into its bed. (Fig. 23.) The graft should now be tested to see if it will stand the weight of the fore arm. The fascia and muscles are sutured, dressings applied, and the arm put up in plaster of Paris from axilla to fingers, with the elbow at a right angle to the fore arm in as much supination as possible. Union is expected in six to eight weeks in favorable cases and the plaster removed and stimulative treatment begun to restore joint motion and muscle tone. Figures 24-27 illustrate bone graft of humerus showing condition before and after operation. (From Alder Hey Hospital, Liverpool.) Figures 28-29 illustrate bone graft of 1st metacarpal bone before and after the operation. (From Alder Hey Hospital, Liverpool.)

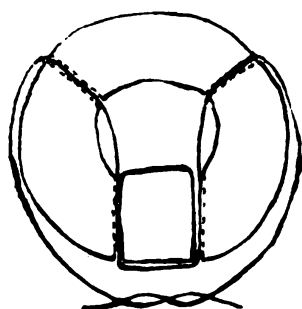


FIG. 28.—Method of fixing inlay bone graft in position.

BONE AND JOINT INJURIES.

Shoulder.—Serious injuries of this joint, with considerable loss of tissue and part of the deltoid, are common. Muscle loss can often be compensated for by transplanting part of the pectoralis major. Skin, if needed, is obtained from the adjacent chest or back. If the head of the humerus is missing (figs. 30-32), it is best to secure a firm bony fixation of the joint by an arthrodesis. A portion of the fibula may be transplanted to supply the loss of head. The joint should be ankylosed in 60° abduction, 65° of forward flexion, 15° of flexion of the elbow, and 15° elevation of the forearm.

Joint stiffness, when mild in character, is treated by physiotherapy and graduated stretchings. In cases where there is injury to the muscles, to the joint capsule or to the joint surface, it is usually necessary to give an anesthetic and put the arm into abduction, fixing it in that position by a splint, and gradually lowering it during after-treatment. Arthroplasty of the shoulder is not generally successful.

The treatment of stiff joints requires much knowledge, experience and judgment. Nothing is more harmful to an acutely inflamed joint, and nothing is so likely to produce ankylosis in such a joint as the use of forcible movements during the acute stage. Certain joints, like the elbow, resist such movements more than other joints. If full movement can be carried out under an anesthetic with little or no tearing of adhesions there is a probability of securing motion in the joint. When forced movement shows many adhesions present it is better to resort to graduated movements combined with

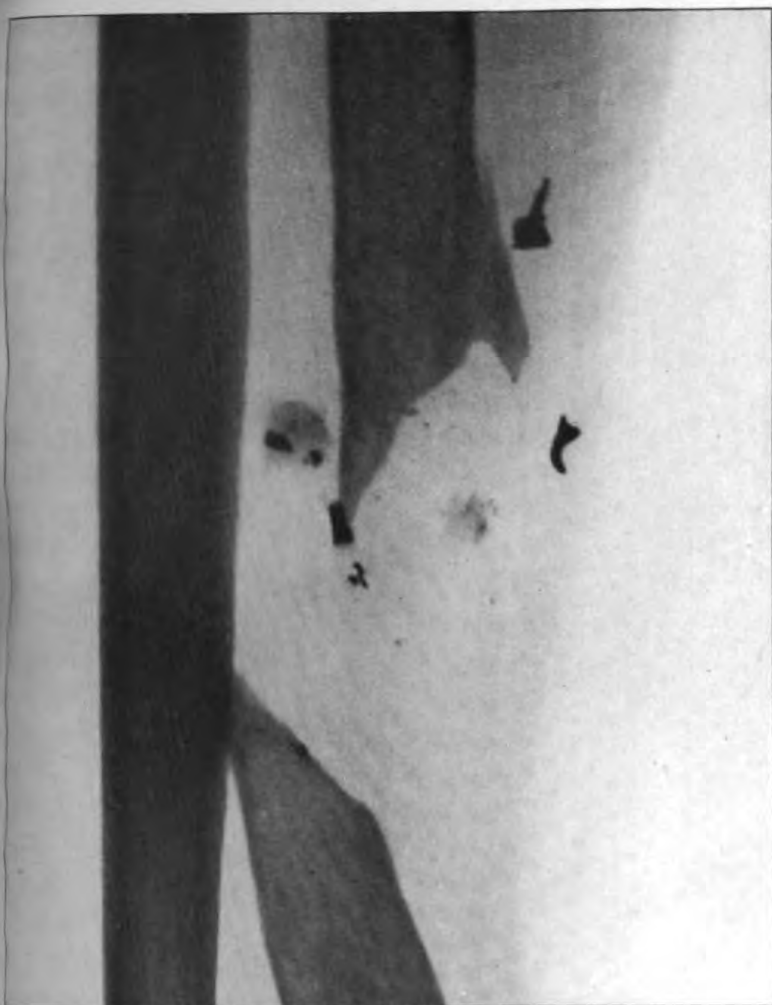


Fig. 24.—Loss of 2 inches of radius from gunshot wound. Condition October 17, 1918. (Alder Hey Hospital, Liverpool.)

80-1



Fig. 25.—Same as figure 24. Condition November 9, 1918, showing lateral bone graft in position and arm in plaster-of-Paris fixation.

80-2

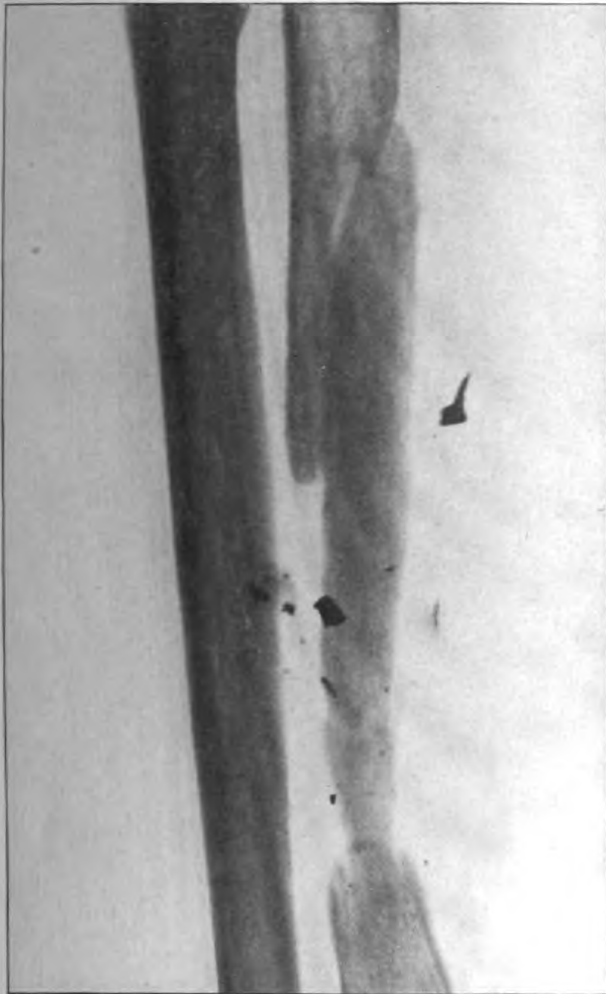


Fig. 26.—Same as figure 24. Condition of graft January 14, 1919. Lateral view.

90-3

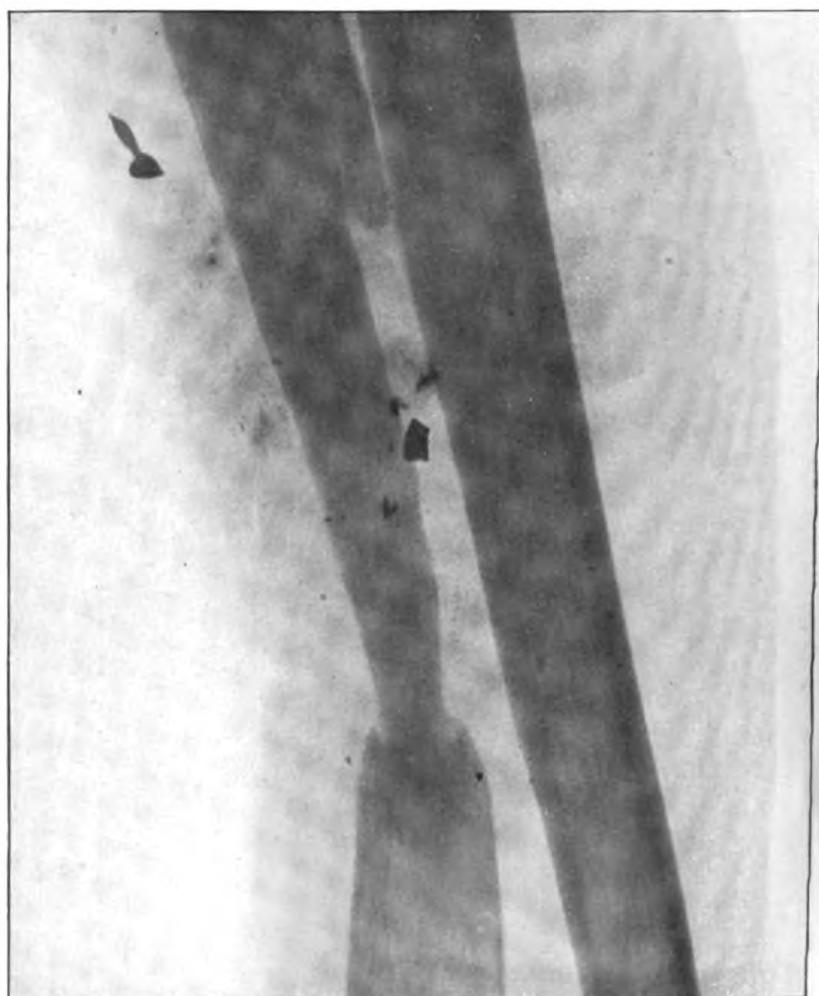


Fig. 27.—Same as figure 24. Condition of graft January 14, 1919. Antero-posterior view.

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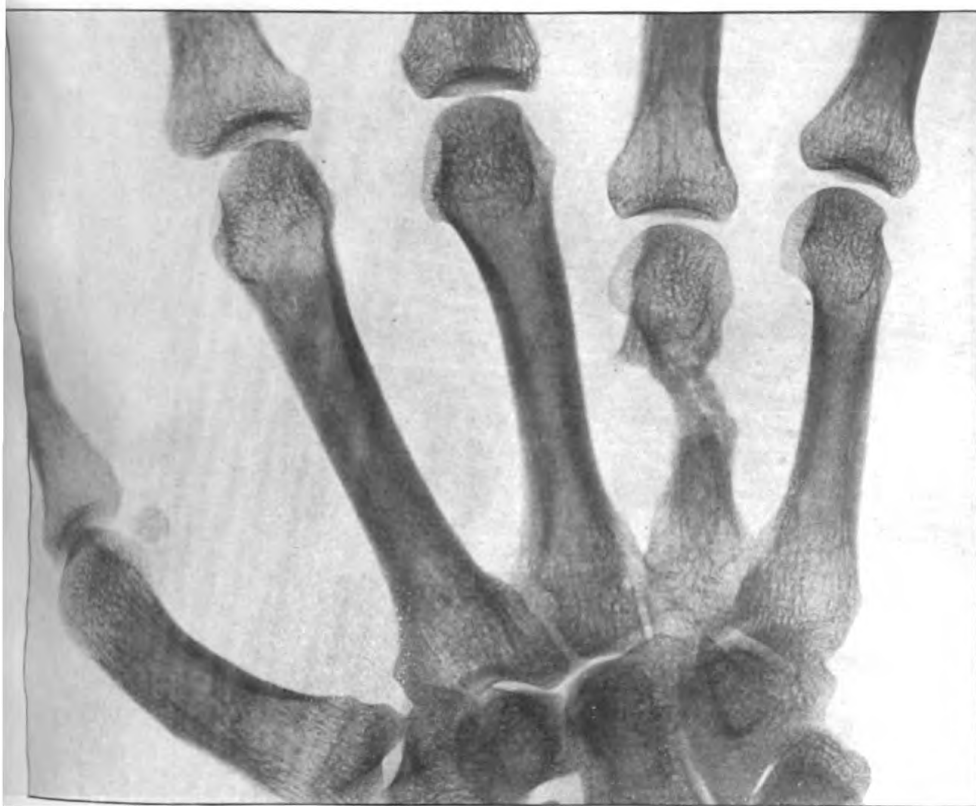


Fig. 28.-Fracture of fourth metacarpal bone. Condition March 7, 1918, before bone-graft operation. (Alder Hey Hospital, Liverpool.)

80-5



Fig. 29.—Same as figure 28. Condition March 28, 1918, showing bone graft
in position.

80-6



Fig. 30.—Gunshot wound of left shoulder, showing absence of upper end of humerus. No involvement of main nerves. (Second Birmingham War Hospital.)

80-7



80-8 Fig. 31.—Same as figure 30, showing position of ankylosis obtained.

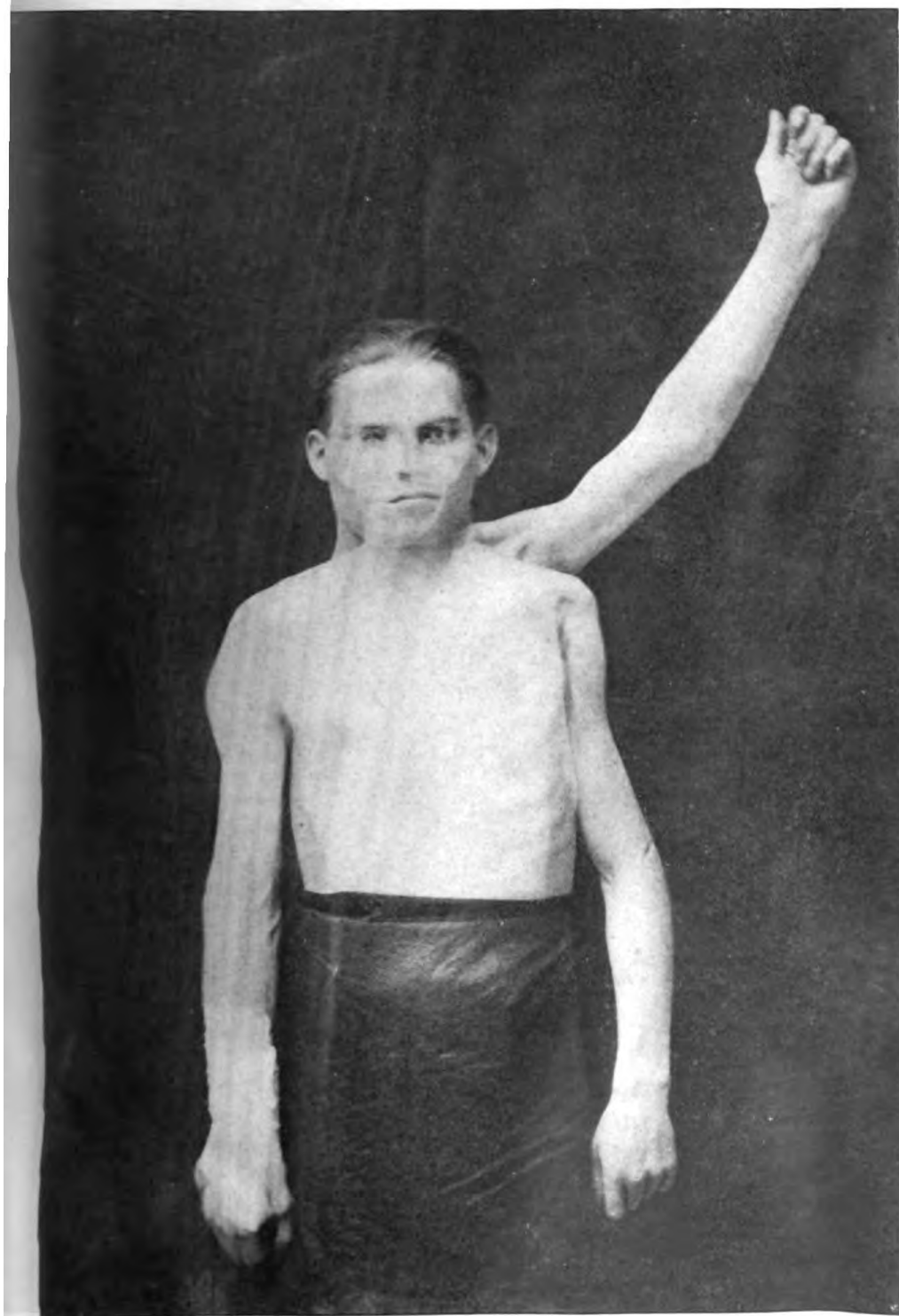


Fig. 32.—Same as figure 31, showing range of scapular movement obtained.

80-9



Fig. 34.—Injury of upper radio-ulnar joint resulting in ankylosis in supination. The low radio-ulnar joint was also ankylosed. (Second Birmingham War Hospital.)

80-10

physiotherapy or to secure a little movement under an anesthetic and fix the joint in its new position. After the inflammation has subsided the joint may be again moved and immobilized in another position.

Ununited fracture of the humerus.—This bone is more often the site of nonunion than any other. It may be treated conservatively by a molded leather splint with a joint at the elbow. Very often the condition must be treated surgically. This bone does not take kindly to the autogenous bone graft, and the most successful operation is one in which both upper and lower fragments are cut half-way through and one-half of the shaft for $1\frac{1}{2}$ inches removed. The fragments are then overlapped, drilled, and sutured. (Fig. 33.)

Elbow.—If the injury has resulted in a stiff elbow at 100° or 110° of flexion and the fore arm midway between pronation and supination it is well to think twice before recommending any operation to give more movement in this joint. Strength of the arm is the first consideration, and if enough bone is removed to allow free movement of the elbow lateral mobility is so great as to produce weakness. Attempts to force motion in an elbow where some degree of motion is present are generally unsuccessful, since the elbow resists such insulting treatment. (Figs. 34–35.) The joint may be fixed in a splint consisting of an arm and forearm part, with a screw attachment at the joint level by which the angle of the joint may be gradually changed. A few months of this treatment often restores a certain amount of motion. Arthroplasty gives good results in properly selected cases. The flail elbow is an exceedingly difficult problem. In some cases if the elbow is kept flexed for one or two months there will be an adaptive shortening of the muscles, and a certain amount of power and stability will return. In severe cases the ends of the three bones may be shaped to fit each other and held together by sutures or by a bone graft. In the end, it is often necessary to resort to an external splint, preferably in the form of a molded leather support.

Loss of rotation.—If the synostosis is at the upper radio-ulnar joint, the head of the radius and a portion of the upper part of the shaft should be removed. Bad results follow if not enough of the shaft has been removed. If the synostosis is at the lower radio-ulnar joint, 1 to $1\frac{1}{2}$ inches of the lower part of the shaft of the ulna should be removed. (Baldwin's Operation; figs. 36–38).

Ununited fracture of radius and ulna.—These conditions are usually successfully treated by the autogenous bonegraft. Before operation in these cases mobility of the hand should be restored,



Fig. 33.—
"Step-cutting" operation in ununited fractures of humerus.

radial deviation of the hand corrected, and the forearm fixed in supination.

Ischemic contractures.—In the severe cases the wrist is flexed, the fingers are contracted and the structures on the front of the arm shortened. Conservative treatment gives the best results. The wrist and metacarpo-phalangeal joints are fully flexed, and a band of Paris bandage molded to fit the palmar surface of the hand and fingers. Then gradual movement of the wrist toward the position of extension is begun. The fingers are first straightened, and then, with the aid of an anterior splint, the wrist is similarly brought into extension. The stretching process is continued until dorsiflexion of the wrist and wrist is produced. The extensor muscles are given electrical treatment, the splint is omitted in the daytime, and treatment continued as long as may be necessary.

Wrist and hand.—Most forearm injuries arrive at the hospital with movement at the elbow limited below a right angle, the forearm pronated, the wrist showing limited movement in flexion and extension, and fingers stiff in extension.

Such disabilities may result from contractures following an injury or due to a nerve injury in the arm. Other cases are attributable to sepsis, to fibrosis around joints, or to long continued splinting. These deformities are best overcome by applying the principle of gradual correction, often employing traction on the fingers. The tension and elasticity of shortened structures is overcome and the limb is slowly molded into the desired position.

Many ingenious splints for producing traction in various directions of flexion or extension have been devised, notably those of Veatch and Baldwin (San Francisco). Many surgeons depend upon plaster of Paris, gradually molding it to fit the limb as the deformity changes. The prime essential in hand injuries is to restore the grip. For this reason it is well to begin reconstructive treatment of the upper extremity at the fingers. Physiotherapy is of the greatest value in these cases.

The first (proximal) row of carpal bones may be sacrificed at times to produce a useful hand. If necessary to remove any of the first row, every effort should be made to preserve the trapezium and joint between it and the first metacarpal and the pisiform.

Stiffness and ankylosis of the hip joint.—The two most common deformities are adduction and flexion. Mild cases may be overcome by graduated stretching. Care should be taken to flex the opposite hip on the abdomen when performing such manipulations as otherwise the energy will be wasted in producing simply a lordosis of lumbar spine. If ankylosis has occurred with the hip in slight deformity it should not be disturbed. When the deformity is disabling it is best corrected by the transtrochanteric osteotomy of Jones.

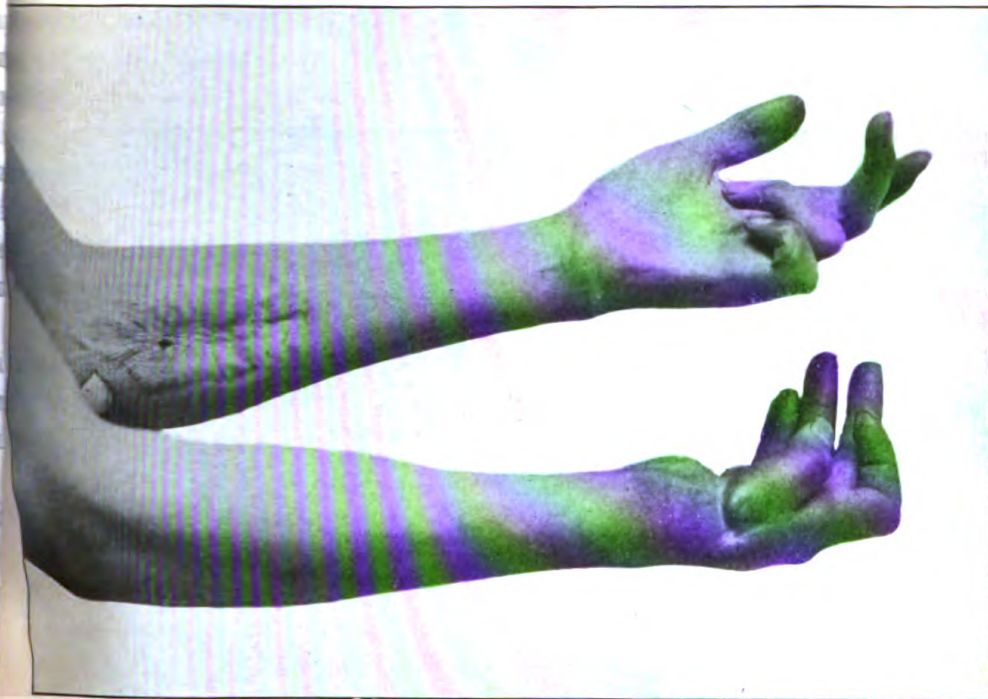


Fig. 35.—Same as figure 34.

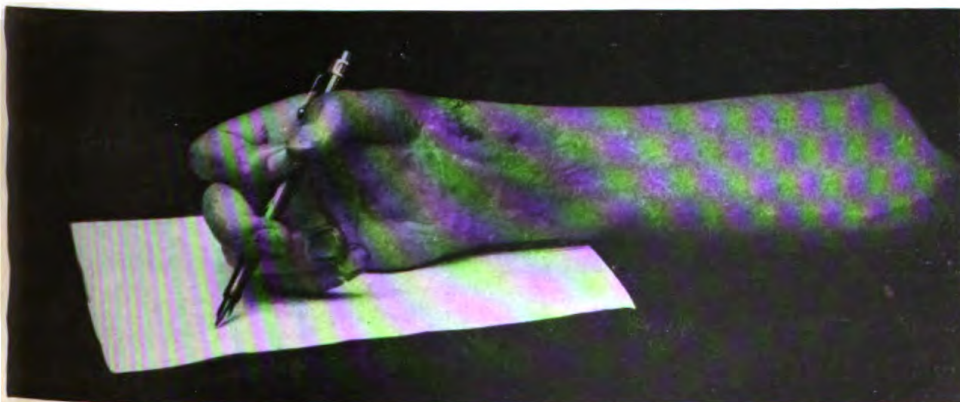


Fig. 37.—Same as figure 34, showing difficulty in writing with hand in full supination.

82-1



82-2

Fig. 38.—Same as figure 37.



Fig. 36.—Same as figure 34, showing Baldwin's operation of removing a section of the lower end of the ulna in ankylosis of the lower radio-ulnar joint.

83-1

the subtrochanteric osteotomy of Gant. Excision of the hip should be reserved for cases of bilateral ankylosis and in certain exceptional cases of ankylosis. The excision should be performed on the weaker hip. The flail hip joint is best treated by a caliper splint.

Knee joint.—Gunshot wounds of this joint have produced very severe injuries in this war. The character of the knee joint, with its large cul-de-sacs has favored infection, and the destruction of important stabilizing structures, such as the crucial ligaments, has left a weakness which is very disabling. Many of the conditions encountered resemble the derangements seen in civil practice and will not be considered. The treatment of stiffness and ankylosis of the knee joint is similar to that of the elbow, and the use of a jointed splint, like the MacIntyre, is probably the best method of procedure. A flail knee is useless without external support like a brace. Ankylosis should be attempted in all cases.

Irithowan (Shepherd's Bush Hospital) has made an interesting contribution to the treatment of stiff knees, especially those following a fracture of the femur. He performs an arthrotomy by splitting the joint vertically and thus gains the widest possible view of the joint. Villous outgrowths and adhesions are usually present. These are removed and the joint sutured tightly. The knee is splinted for two days, movement is then begun, and weight bearing is allowed in a week to 10 days. The results in the few cases in which this operation has been performed seemed to show that the function of the knee was restored much quicker than by conservative methods. Further observation will be necessary to determine the ultimate value of this procedure.

Reconstruction of the crucial ligaments.—An ingenious operation for the reconstruction of these important structures, when conservative methods have failed, was first published by Hey Groves,¹ and later modified by Alwyn Smith.² When the anterior crucial ligament has been destroyed a transplant of fascia lata 10 inches long, fixed at its upper end, is turned down and passed successively through holes drilled in the external condyle of the femur and the external tuberosity of the tibia. It is then turned upward and inward and passed through a hole drilled in the internal condyle of the femur, where it is made fast. (Fig. 39.)

The semi-tendinosus tendon may be similarly used for repairing the somewhat rarer injuries of the posterior crucial ligament.



Fig. 39.—Alwyn Smith operation for reconstruction of anterior crucial ligament.

¹ Hey Groves, W., *Lancet*, Nov. 3, 1917, II, 674.

² Alwyn Smith, S., *Brit. Jour. Surg.*, 1918, VI, 176.

Trethowan has attacked the problem by passing heavy quilted silk sutures in the form of an X following the track of the crucials between the femur and tibia.

Ankle and foot.—The deformities seen in this region closely resemble those of civil life. Various forms of talipes occur and are treated by proper splinting. In no part of the body is the use of splints more important than in these deformities. When operations are necessary wrenchings, tenotomies, and removal of bone wedges followed by fixation in plaster of Paris, are usually sufficient. Claw foot and hallux rigidus are often seen following trench foot.

Traumatic myositis ossificans.—The formation of new bone in the muscles near a joint following a severe injury is occasionally the cause of joint stiffness. The treatment should be rest in a standard position followed by physiotherapy. Forced movements are likely to result in increased stiffening.

STANDARD POSITIONS OF JOINTS.

These are positions which give the greatest usefulness combined with strength, if the joint is to be fixed naturally or artificially in ankylosis.

Shoulder joint.—Abduction to 60° – 65° , 15° flexion of elbow, 15° elevation of forearm (Stiles). If the scapula be movable, the arm can be adducted to the side and abducted beyond a right angle.

Elbow joint.—For most occupations 110° . This angle does not, however, allow the hand to be brought to the mouth or put behind the head. If both elbows are to be stiffened, one should be put at 110° and the other at 60° .

Forearm.—Midway between pronation and supination.

Wrist joint.—Extension to 45° , i. e., the position assumed when the fist is closed.

Hip joint.—Flexion to 25° with the thigh vertical, patella pointing forward, toe pointing out. The flexion is to allow comfortable sitting. If there is shortening of the limb, the hip should be abducted to compensate for this. Compensation is possible up to $1\frac{1}{2}$ inches of shortening.

Knee joint.—Full extension.

Ankle joint and foot.—Foot at right angle and neither inverted nor everted. Slight degree of equinus is permissible and at times even valuable, but much equinus or calcaneus is disabling.

SPLINTS.

The splints used in the British military orthopedic hospitals are usually of the Thomas type, often modified to meet special conditions. The principle of these splints has proved sound and they are

well adapted for keeping the limb in a proper position for restoration of function and at the same time to permit dressing of wounds.

These splints have been so thoroughly described in current literature that they will not be taken up in detail.

INJURIES OF THE PERIPHERAL NERVES.

Injuries to the peripheral nerves in this war have been common and serious in their outcome. The comparative rarity of such injuries in civil life has not hitherto furnished the necessary opportunity for a proper study of these cases. With the abundant material now at hand, the diagnosis of nerve injuries and their repair by sound surgical procedures have been well established.

Various types of nerve injury are recognized:

(1) Simple contusion where there has been a hemorrhage into the sheath of the nerve, but the axons are uninjured.

(2) Crushing, where some of the axons are divided.

(3) Perforation, where the missile has passed through the nerve, with interruption of some of the axons.

(4) Section, where the whole nerve has been divided. The ends may be separated and tissue interposed between them, or a piece of nerve may be missing.

(5) Compression, resulting from constriction by scar tissue or callus.

When a nerve is divided, the part beyond the lesion degenerates. The proximal end of the distal fragment enlarges and is called a *glioma*. The axis cylinders immediately begin to grow out from the end of the proximal fragment. If no obstruction is encountered they continue to their terminal distribution. In this way the normal regeneration of the nerve is accomplished. If scar or other tissue intervene, the axis cylinders form a swelling known as a *neuroma*.

Diagnosis of nerve injury.—This may be made by examination of the wounds, noting the path of the missile, by the loss of voluntary movement in the muscle supplied by the nerve, by loss of sensation, by changes in electrical reactions of the muscles, and by examining the nerve throughout its course.

The diagnosis and treatment of nerve injuries is purely an anatomical problem. An accurate knowledge of the origin, course, muscular distribution, and relations of the peripheral nerves is necessary in order to determine what nerve has been injured, and at what level it has been severed or compressed.

It is advisable to examine for voluntary power in all the muscles supplied by the nerve in question. For general purposes it is necessary to test but one motion to be assured of the integrity of a nerve. For example, in a wound in the middle of the arm, ex-

tension of the wrist will test the musculo-spiral nerve, abduction and opposition of the thumb will test the median nerve, and abduction of the little finger will test the ulnar nerve. Sensation is examined by touching the tip of the index and little fingers on the palmar surface with cotton wool. By these simple procedures the condition of the three important nerves supplying the forearm and hand is determined.¹

Both clinical and electrical tests are necessary to determine the extent of the injury. Clinical tests in the hands of a surgeon with experience in nerve injuries are fully as dependable as electrical tests. Electrical reactions are usually accurate, but at times they are badly at fault. If a nerve be exposed by an incision, the electrical examination made directly on the nerve is accurate. If, however, a layer of tissue intervene, as in the ordinary test, the current may not reach the nerve in question. This may happen because of certain insulating influences in the tissues, or the impulse may be transmitted to a nerve on the opposite side of the limb. The result is that the muscles supplied by the latter nerve are "set" and prevent action of the opponent muscles which are being tested.

Electrical tests.—These are extremely simple. If the muscle responds to the faradic current the nerve is intact, at least in some of its fibers. The only exception to this is in the case of a very recent injury in which degeneration of the distal part of the nerve has not taken place. If the nerve has been divided, the muscles supplied by it will still respond to interrupted galvanism, if they remain uninjured. If the nerve is intact, the response to galvanism is quick and lively; if the reaction of degeneration is present the response is slower and wavelike.

The response to faradism is often deceptive because a few intact fibers will transmit the current, while the main trunk of the nerve has been severed and is in need of surgical repair. In case of doubt, or when improvement has not taken place in a reasonable length of time, it is justifiable to cut down upon the nerve and explore and test it thoroughly.

The course of the nerve should be palpated for neuromata and to elicit pain. Pain below the site of injury indicates that the nerve is not completely divided. If the nerve is regenerating, gentle percussion causes a tingling sensation, formication, in the area of sensory distribution.

Nerves are the seat of irritation which manifest themselves in various degrees of neuritis. The most persistent and painful form

¹ In certain rare instances the distributions of the median and ulnar nerves are reversed, the median supplying the inner side of the hand and the ulnar the outer. As an addition to our knowledge of nerve physiology, it has been discovered recently that the ulnar is the motor nerve of the middle finger.

of neuritis—causalgia—often results in muscular fibrosis, and atrophy of the tissues.

Splinting.—As soon as paralysis is recognized it should be treated by proper splint. In many cases this permits a return of function (to muscles which are not actually paralyzed) by removing the weight and allowing the muscles to regain their normal tone. In cases of true paralysis it prevents over stretching of muscles and irremediable deformities.

THE INDIVIDUAL NERVES.

It is impossible in such an article as this to consider all the variations in paralysis produced by injury to the nerves at different levels and in various ways. Consequently only the typical lesions will be discussed.

UPPER LIMB.—*Musculo-spinal nerve.*—This nerve is associated with extension of the wrist. It is the most frequently injured of all nerves, and recovers particularly well after suture. The typical deformity is wrist drop from paralysis of the extensors of the forearm. The hand should be kept in hyperextension in a cockup splint.

Median nerve.—From the point of view of the man who gains his livelihood with his hands this is the most important nerve in the body. When this nerve is divided, pronation is lost and the terminal joints of the thumb and index finger can not be flexed, but flexion of the wrist and metacarpo-phalangeal joints is still possible. In splinting, the chief essential is that the thumb be kept abducted.

Ulnar nerve.—The typical injury is inability to flex the ring and little fingers and lateral movements of the fingers are lost from paralysis of the interossei. The splint should keep the wrist extended, the metacarpo-phalangeal joints bent to a right angle, and the fingers straight.

Circumflex nerve.—Paralysis of the deltoid with inability to raise the arm is the result. The arm should be splinted in right angled abduction.

Musculo-cutaneous nerve.—The elbow can not be flexed if the forearm is in full supination. The splint should maintain the elbow at a right angle and the forearm in full supination.

Median and ulnar nerves.—Injury to these important nerves results in the flat hand, with hyperextension of the metacarpo-phalangeal joints and flexion of the fingers.

Brachial plexus.—Injuries to this important structure are difficult to diagnose and to treat and will not be discussed.

LOWER LIMB.—The nerves of the lower limb are less often injured than those of the upper. The plexuses are well protected and outside of the great sciatic, the nerves are comparatively small. Tro-

phic sores are common in injuries of the lower leg. Because of these sores and the impossibility of repairing many injuries of the sciatic nerve, it is necessary to amputate more often in the lower than in the upper extremity.

Anterior crural nerve.—Injury of this nerve is uncommon. Loss of extension of the knee results.

Great sciatic nerve.—The paralysis produced depends entirely on the level at which it is injured. Diagnosis is often missed because of the recumbent position of the limb. Even when injured high up in the thigh only isolated muscles in the leg may be found paralyzed. When the internal popliteal branch is severed, plantar flexion of the foot is lost; the corresponding injury to the external popliteal branch results in inability to dorsiflex the foot.

NERVE SURGERY.

Surgical intervention is necessary in all cases of complete interruption of a nerve; in cases of incomplete interruption where no improvement is observed after several weeks; in all cases of compression of a nerve; and in certain painful irritative nerve lesions. The following technique is that employed by one of the best orthopedic surgeons in the British Isles.

Technique of operation.—Ether or chloroform anesthesia. Usual preparation of the skin with iodine. No tourniquet is used. Three assistants are necessary; one to manipulate the limb, one to hold retractors, and one to clamp vessels. Transverse scratches are made with a needle in the skin area to be covered by the incision. These scratches furnish guides for the accurate approximation of the edges of the incision, in case it is found necessary to change the position of the limb.

The incision is a long one, going well to either side of the point where the nerve is bound down by scar tissue. This point is usually indicated by a bulb (neuroma), which can be felt through the skin. One incision over the normal course of the nerve is usually sufficient, but with the musculo-spiral nerve two incisions may be necessary, one high up on the inner side of the arm extending down to the musculo-spiral groove; the other on the outer side from the musculo-spiral groove to the bend of the elbow.

The nerve is first dissected out in healthy tissue from above and traced down to a point where it is lost in the scar. The same procedure is carried out in the lower angle of the wound. The reason for this precaution is that the nerve may be displaced from its normal relations by scar tissue and injured by the dissection.

Guide sutures of fine linen are now passed through the nerve sheath at each angle of the wound. This serves to prevent rotation

the nerve. Every attempt should be made to preserve the branches going to the muscles. They may be dissected up for a distance without being divided.

When there is a loss of several inches in the nerve trunk it is necessary to resort to various devices to approximate the ends. Assuming the operation is in the upper arm, the elbow may be flexed at a right angle or even more, and 2 or 3 inches will be gained. The arm may be flexed and another inch will be gained. Adduction of the arm to the side of the body will give still further length. The nerves may be dissected up from their beds above and below the skin and more length obtained. Pulling on the nerve, especially at the distal end, will gain something. The nerve may be transplanted from its normal position to a point on the front of the arm. In transplanting a nerve an attempt should be made to put it under the skin and not to leave it directly beneath the skin.¹ As a last resort sutures may be passed through the ends of the nerves, leaving the bulbs on, and the nerves approximated as much as possible. The nerves stretch and a few weeks later, if a second operation be performed, the nerve ends will be found to have come together. The nerves can now be resected again and healthy nerve joined to healthy nerve.

If the last expedient fail, nothing is left to consider but a nerve graft and this is tantamount to failure. The reason for this seems to be that before the axis cylinders have grown down into the sheath of the grafted nerve from the proximal end, fibrous tissue has grown at the distal end of the graft, and further growth of axis cylinders downward is prevented. *Nothing but end to end suture of healthy nerve ends is of any value.* Partial removal of bulbs, partial excision of one side of a nerve and turning down part of the nerve to bridge a gap, lateral transplantation of one nerve into another nerve—all are failures. The use of a tube such as a piece of vein or artery, with the idea that it forms a permanent cylinder into which the new axis cylinders can grow, is a delusion. Instead of serving its intended purpose, it induces a rapid growth of fibrous tissue within the tube which chokes the axis cylinders. When two healthy nerve ends are brought together, the axis cylinders grow down from the proximal end into the sheath of the distal end of the nerve. There is a chemical affinity between the growing axis cylinders and the nerve sheath in

¹ There is a noteworthy resistance to infection in these cases. I remember a case of median nerve paralysis in which the elbow was firmly fixed at a right angle. It was necessary to excise seven inches of the median nerve in the forearm. In order to approximate the healthy nerve ends the nerve was drawn taut as a bowstring over the front of the forearm and the skin sutured over it. (Bristow.) There was every reason to think that the wound would suppurate, and yet it healed by first intention.

the distal part, so that the axis cylinders find a hospitable environment for growth.

When the nerve trunk has been dissected free from the scar which binds it down, it is found to contain one or more bulbous neuromata. These bulbs are excised and the nerve ends inspected. If they are composed of fibrous tissue a thin section of nerve is removed and another inspection is made. Similar sections are removed until normal bundles of axis-cylinders are seen, and the nerve bleeds in a healthy manner. It is immaterial how much of the nerve is removed but very essential that the ends are healthy.

The ends are now approximated by one of the methods indicated above and the circumference of the nerve is sutured with N silk on a fine-curved intestinal needle. The sutures are interrupted and by preference penetrate the sheath only. It is advisable to suture the nerves under slight tension and to leave a gap of one-eighth to one-sixteenth inch between the ends. As the ends are stretched the ends will come into accurate approximation. *If the ends are placed together at the beginning, they will stretch just the same and become curled or twisted, so that the axis-cylinders will be thrown out of proper alignment.*

The nerve is now dropped back into its bed, buried under normal skin if possible, and the skin sutured. The limb is put up in a splint in an over-corrected position. In the arm the elbow is bent to some degree of flexion and possibly the wrist as well; except in muscular spiral paralysis the wrist is splinted in hyperextension. In the leg the knee will usually require to be flexed and the foot dorsiflexed in cases of external popliteal paralysis, and plantar flexed in cases of internal popliteal paralysis. A group of muscles will recover their power quickest if the limb is put on a splint which keeps it in contraction and at the same time puts the opposing muscles in the stretch.

After a few weeks the limb may be gradually straightened. It is lowered a few degrees and then fixed for a fortnight or so. The process is repeated every two weeks until the limb can be normally straightened. In this way the nerve gradually stretches and accommodates itself to the changed position of the limb.

The question has been raised regarding the rotation of the nerve trunks at the time of suturing. Is it probable that the result will be vitiated if the left side of the proximal end were approximated to the right side of the distal end? Probably not, if the nerve fibers were all motor. In a compound nerve, motor fibers should not be contacted with sensory fibers from a theoretical point of view. In practice trouble rarely results in such cases. There are two theories to explain this: (1) That motor fibers in the proximal segment have the ability to seek out and join themselves to motor fibers in the distal segment.

that there are more axis-cylinders, both motor and sensory, than possibly be used.

Recovery of function after nerve suture varies with the particular nerve involved and with local and general conditions. The time varies from a few months to 18 months or longer, an average time being 12 months. The musculo-spiral and the external popliteal, being homologous nerves, recover comparatively quickly. On the other hand, the ulnar is proverbially slow in recovering. It is said that the diagnosis of ulnar paralysis is missed in 50 per cent of the

experience in nerve surgery has shown that a nerve may be treated like any other tissue without injury if it be done skillfully and carefully. Compression of a nerve may be as serious as complete section. If fibrous tissue forms between the damaged axis cylinders, no impulses can pass over the nerve, and the condition usually requires surgical interference.

Results in nerve injury.—Of cases showing complete physiological interruption 55 per cent recover voluntary power and sensation to a certain degree without operation. A few recover completely. The longer a septic condition has existed in a limb, the slower the recovery of the nerve. Nerves sutured immediately after the injury recover more slowly than those which have been sutured six months after injury. A painful nerve injury accompanied by trophic changes recovers better than cases where no such sores are present. The nerve is probably merely frayed in the first instance, but completely severed in the second.

Signs of recovery in a nerve.—(1) Tinel's sign is the most valuable. When the skin over the nerve is tapped or compressed a prickly tingling feeling known as formication is felt in some part of the course of the nerve. This represents the level which the growing axis cylinders have reached.

(2) Return of protopathic sensation (pinprick).

(3) Increase in tone of paralyzed muscles.

(4) Increase in girth of small muscles, remembering that small muscles necessarily increase more slowly than large ones. It is difficult to say when return of power may be expected.

(5) Response to electric current. Response to galvanism is noted before response to faradism.

(6) Return of epicritic sensation (cotton or camel's hair brush).

Nerves are tested at regular intervals, usually once a month to note progress. The clinical and electrical examinations are charted and the record compared with previous examinations.

After-treatment of nerve injuries.—The aim is to preserve nutrition of muscles and mobility of joints and tendons. This is accom-

lished by the daily use of galvanic or faradic electricity, continued, for 10 minutes, often preceded by the whirlpool bath followed by massage. Later, voluntary movements and rational exercises are begun.

TENDON TRANSPLANTATION FOR PARALYSIS.

In cases where nerve suture has failed, or where for any such suture can not be performed, a fairly serviceable limb secured by tendon transplantation of strong muscles into those that are paralyzed. In some paralyses but little can be gained, in others the results are very gratifying.

In musculo-spiral paralysis transplantation of the wrist into the paralyzed extensors will give a hand 75 per cent efficient. This is the most frequent example of tendon transplantation. The description of the usual technique will suffice in the case of other paralyses, modified by local conditions prevailing.

The operation is designed to take flexors of the wrist which can be spared and insert them into the paralyzed extensors of the wrist and fingers. There are four flexors of the wrist: The flexor carpi radialis, palmaris longus, flexor carpi ulnaris, and the pronator teres. Some surgeons use all four flexors, but the palmaris longus is not always present, and it is considered wise to leave one flexor. The general practice is to transplant the three remaining flexors.

Technique of operation.—Two incisions are made on the front of the forearm from the upper level of the wrist joint, two-thirds the distance to the bend of the elbow.

The first incision is just to the outer side of the tendon of the flexor carpi radialis. The tendon of this muscle is freed the length of the incision, and the dissection is carried around beneath the skin to the dorsal surface. A second incision of similar length is made just to the inner side of the tendon of the flexor carpi ulnaris. The tendon is freed, dissected up the forearm, and the muscle separated into its tendinous and fleshy portions. The dissection is carried around beneath the skin to the dorsal surface. The tendons of the flexor carpi radialis and palmaris longus are severed near their attachments. The split tendon and the muscular portion of the flexor carpi ulnaris are severed at a low level. The forearm is turned over and a median incision made on the dorsal surface from the upper level of the wrist joint two-thirds the distance to the elbow. The tendon of the pronator radii teres is dissected up and severed. The tendons of the extensor longus pollicis, extensor brevis pollicis, extensor ossis metacarpi pollicis, extensor minimi digiti, extensor communis digitorum, and extensor indicis are freed up in the same order, but not otherwise disturbed. The anterior tendons are

ought beneath the skin to the back of the forearm and clamped. The anterior skin incisions are closed. The flexor tendons are next sutured into the extensor tendons just above the wrist joint, after being passed through slits in the extensor tendons in the following order: (1) Pronator radii teres into combined extensor carpi radialis longior et brevior; (2) flexor carpi radialis into extensor brevis pollicis and extensor ossis metacarpi pollicis; (3) Palmaris longus pollicis into extensor longus pollicis (this transplantation is often omitted); (4) flexor carpi ulnaris (*a*) fleshy portion into extensor carpi ulnaris, (*b*) tendinous portion into extensor indicis, extensor minimi digiti, and extensor communis digitorum.

While the tendons are being sutured the hand is kept in full hyperextension with the fingers extended and the thumb abducted. The extensor tendon is pulled up by one assistant, and the transplanted flexor tendon is pulled down by another assistant, while the sutures are being placed. The transplanted tendons are neatly buried by incision sutures at an oblique angle with the extensor tendons. A long stock-up splint is worn for at least six weeks. No attempt is made to hurry movements of the newly placed muscles, and they apparently function well in their foreign situations.

Ulnar paralysis.—The patient has a useful hand in 75 per cent of these cases and nothing operative is usually indicated. In some cases of ulnar paralysis with loss of flexion of the little and ring fingers, the two outer tendons of the flexor profundus digitorum, which are innervated by the median nerve, may be sutured to the two inner tendons of this muscle (innervated by the ulnar nerve).

Median paralysis.—In these cases the hand is useless at least as to flexion of the thumb and index finger. The extensor carpi radialis longior may be transplanted into the flexor longus pollicis and movement of the thumb becomes possible.

Circumflex paralysis.—Transplantation of the trapezius to the deltoid is not successful, and arthrodesis of the shoulder joint is the best treatment of irreparable injury to the circumflex nerve.

Anterior crural paralysis.—If the quadriceps is paralyzed, the biceps alone may be transplanted, or the semi-tendinosus or gracilis, or both in connection with the biceps.

External popliteal paralysis.—Although this nerve, like the musculo-spiral usually recovers quickly and well, a permanently dropped foot occasionally results from complete paralysis. It is then necessary to fix the foot at a right angle or slightly more. This may be done by cutting off the tendons of the tibialis anticus and peroneus brevis 4 inches above the ankle joint. A hole is drilled in the front of the tibia 2 inches above the ankle joint, the ends of the tendons passed through this hole, turned back on themselves and sutured. In this way loops of tendons are made to pass through the bone.

Internal popliteal paralysis.—To prevent dorsiflexion one-half the tendo Achillis may be fixed into the tibia behind, leaving the other half in its normal position.

FUNCTIONAL DISABILITIES.

The recent war has been characterized by two outstanding features from a medical point of view: (1) The almost complete absence of camp diseases, such as typhoid fever, cholera, etc.; (2) the enormous number of nervous cases induced by the tremendous bombardments, noise, and confusion to which combatants and civilians alike have been subjected.

The nervous or functional cases were originally called "shock" cases until that term fell under the ban and became a stigma. The diagnosis has been abolished by the war office, and such cases are now called functional.

At the Seale Hayne Military Hospital in Newton Abbott, Devonshire, several hundred of these cases were under treatment and many remarkable cures were produced.

On entering the hospital as a patient the soldier is allowed a few days to become acquainted with his surroundings and to talk with patients who are undergoing treatment. He is then brought into a consulting room and a thorough physical examination for organic lesion is made. Usually none is found. His condition is then explained to him carefully in simple language, often making use of some homely comparison which will be readily understood. He is made to believe that he has no organic lesion and that he can be perfectly well again. Some cases have an organic element present with which is associated an hysterical element. These cases are treated like the purely functional cases—by suggestion. With the elimination of the functional element the cure of the organic element becomes much simpler. Hypnosis is rarely used except in patients of a mentality too low to grasp the suggestion method, and in cases such as insomnia, enuresis, epilepsy, etc.

Many cases are cured before seeing a physician, by talking with cured patients and with nurses. It is considered advisable to complete the cure at one sitting if possible since the effect is much more lasting in this way. Some cures are made at one short sitting. In many cases it requires several hours to effect a cure. It is well to remember that the cures are not always lasting, however, and many cases relapse after leaving this hospital. The advantage of the treatment is that the patient has the power of cure within himself if he chooses to exercise it.

All sorts of hysterical joint contractures were being treated. (Fig. 40.) Another interesting group were the cases of functional



a Before treatment.



(b) After treatment.

44—Functional deformity of spine. From Seale Hayne, "Neurological Studies," September, 1918. I. 60. Oxford University Press. By permission.

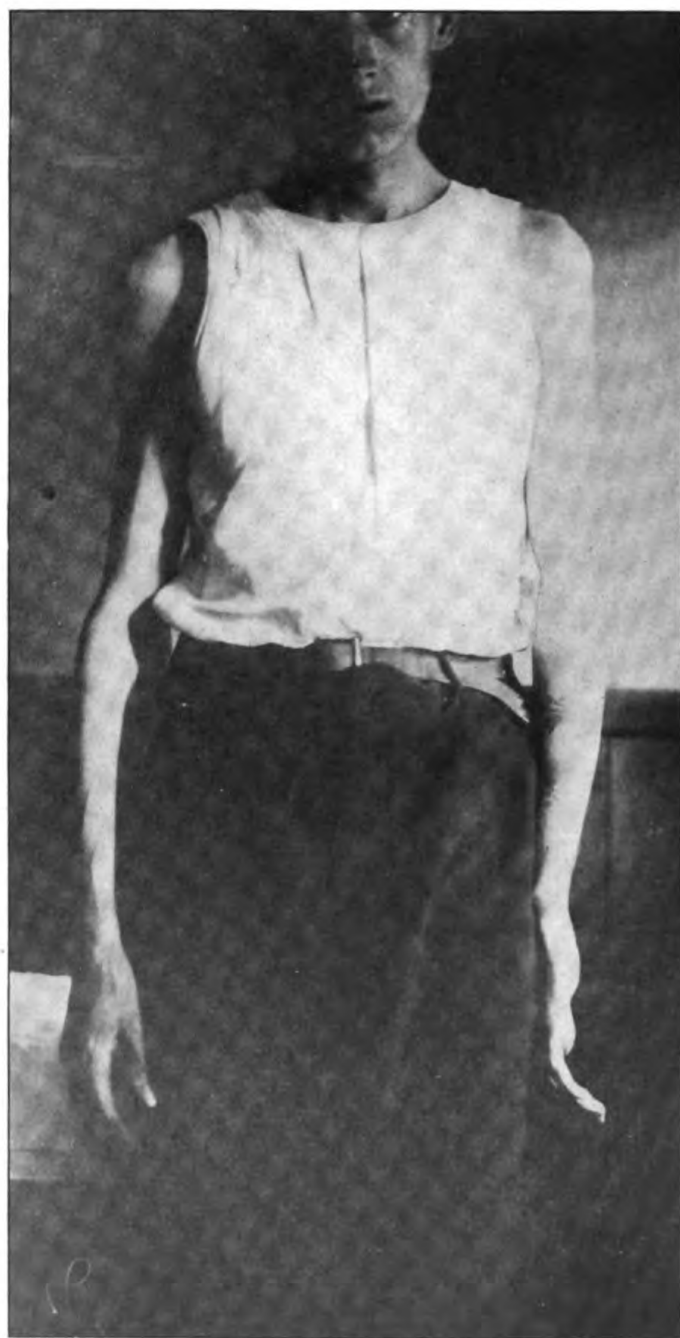


Fig. 41.- Functional disability of left arm in a soldier of A. E. F.
before treatment by the writer.

94-2

blindness, deafness, hemiplegia, amnesia, writer's cramp, and the like, which would puzzle any but the expert to separate from true organic lesions.

It is necessary to distinguish these cases from those of malingering. Functional cases in no way resemble malingering. In the functional attitude of deformity is constant, and the patient is usually ready to be cured when shown the method. Many of these cases are now undergoing treatments in the physiotherapeutic departments of hospitals, often for a long period of time without benefit. A few moments by the suggestion method will nearly always effect a cure.

Incidentally the writer has recently treated a discharged soldier of the American Expeditionary Forces who had spent 10 months in military hospitals in the United States having massage, electricity, and baths. His left arm hung apparently lifeless at his side, and there was a heavy brace attached to his left shoe, with double uprights reaching nearly to the knee. A few treatments cured his arm and the brace was at once discarded. (Fig. 41.)

AMPUTATIONS.

We are accustomed to consider that this war has produced an especially large number of limbless-men, but the number so crippled in the number rendered limbless by the accidents of civil life is practically the same in Great Britain—40,000 in each class.

Amputations at the front were often hurriedly performed as saving measures, and the idea of obtaining a suitable stump for bearing was of necessity lost sight of. Consequently, there were large numbers of secondary amputations and operations for improving the stumps and for removal of nerve trunks, which have caused painful neuromata. When a stump remains unclosed it can often be healed by applying four wide adhesive extension straps around the limb and attaching them to a metal frame below the stump. By this traction the skin and soft structures are pulled down and eventually may cover the bone.

Considering a stump which must be fitted with an artificial leg, there are practically but three amputation levels to be thought of—the point of election above the knee, the point of election below the knee, and the Syme amputation. In the upper extremity an attempt should be made to save as much of the arm as possible. A satisfactory artificial leg can be fitted to any well-shaped stump, but an artificial arm is satisfactory. The stump of a forearm is much more serviceable to a working man than an artificial appliance, however ingeniously fashioned, and the stump of an upper arm is practically useless. In the leg, if the stump is too short below the

knee, it is difficult to fit an artificial leg; if too long, it becomes cyanotic and weight bearing is painful. A leg one-half inch is better than legs of equal length.

Six months' time is usually necessary in military amputation shrinking a stump so that it is suitable for an artificial leg, or twice as long as is necessary in civil cases. Before fitting the appliance it is necessary to correct all deformities of the stump by massage and stretching. One of the commonest of these is the flail deformity at the hip in high amputations of the thigh. If this cannot be accomplished, a leg with a tilting table is made. With this apparatus the thigh stump is kept flexed and the buttock rests on a broad leather saddle attached to the upper part of the artificial leg with straps surrounding the pelvis.

The first artificial appliance is the plaster pylon or bucket, which consists of a plaster of Paris bandage shaped over the stump to take the form of a bucket. Into this is incorporated a wooden peg like the arms of a Wantage crutch. This leg is very satisfactory and many limbless men never use any other. Several months later a wooden leg with jointed knee and ankle and toe joint is fitted. The patient is supplied with two artificial appliances before being discharged to civil life. Measurements are all made from bony points. From the top of the great trochanter to the upper border of the tibia; from the tip of the acromion to the tip of the olecranon when the arm is in full backward extension.

It is difficult to get up enthusiasm over artificial arms, although many of them are very ingenious. The men will not wear them because they are clumsy, difficult to manipulate and interfere with the use of the natural stump in its function as a support. The artificial arms all have devices for flexing and extending the forearm to about six different positions by means of cords passing over the shoulder and operated by shrugging movements of the shoulders. The patient soon learns to operate the locking device skillfully and quickly.

In some cases where the amputation has occurred at a proper level the flexor and extensor tendons may be dissected out, each in a separate sheath. It is first necessary to transplant an abundance of skin. The tendons are passed through loops of skin at the site of these muscle groups and used to operate an artificial hand. A stiff finger, if it interferes with the movements of the hand had better be amputated.

All arms have a movable thumb; some have movement of the first arm and middle fingers, and one arm has the movements of pronation and supination. Clever devices have been made to replace the thumb, or the four fingers if shot away en masse. Various appliances have been elaborated for attachment to the arm stump which are suitable for nearly every occupation. One such prosthesis has

back by which the various implements can be quickly attached without the trouble of screwing and unscrewing each one.

Among the accessories devised for the comfort of the limbless are old-fashioned bathtubs with wide wooden ledge to prevent slipping, soap plates with depression in the center to avoid the necessity of tilting the plate, and deep dishes with overhanging edges, so that food may be pushed against the side of the plate and "corrected."

In the hospital for the limbless there is a cleverly designed garden in which the men learn to use their artificial legs. It consists of rough stone walks, which give a secure footing. These walks have gradual ascents and descents and are raised both on the left and right sides. In this way all the possible strains and stresses of walking are provided.

Learning a trade.—The men quickly learn to use the left hand if they have been righthanded. They are not taught a trade at the hospital, but are given three weeks' instruction in the use of the hand, and opportunity to work in the shops at metal or wood work, painting, automobile repairing, and the like, in the hope that some of them will learn a trade and follow it. There is no expectation, however, that the one-armed man can compete with the two-armed man. Many of them become elevator men, watchmen, or depend largely on the man himself.

FRACTURES OF THE SPINE.

A serious condition of these injuries has not been greatly ameliorated by the experience gained from a large number of cases. Whenever the condition of wounds permits, the patient is treated in molded plaster of Paris bed with extension applied to the spine. The spine may be manipulated under an anesthetic and padded supports placed on either side of, but not on, the deformity of the bony processes. If this treatment is successful, as it often is, in gradually reducing the deformity, the patient is put into a plaster Paris jacket at the end of six or eight weeks and allowed to walk. The opinion is steadily gaining ground that these cases are better treated conservatively by the above methods and that a laminectomy often produces a deleterious outcome.

In many cases this treatment can not be carried out, and the patient is treated on a water bed filled to the comfort of the patient. Sores are cleaned twice daily and a boric acid ointment applied. An air ring is used to protect the sore. The back is rubbed morning and evening regularly and whenever soiled. Pads of cotton and gauze are placed in the bed to collect urine and feces.

Bladder.—The condition of the bladder is a most important symptom. Low spinal injuries always result in cystitis. High spinal injuries have "automatic" bladders; i. e., the bladder fills and urine is passed automatically without the patient being aware of it. Septic cases are treated early by a suprapubic cystotomy and a Guyton tube of large size inserted. The patient at first drains into a bottle for a few days. When the end of the tube becomes embedded in granulation tissue, the outlet is clamped and the bladder is irrigated periodically with 1-4,000 potassium permanganate solution, the urine being released from the clamp at the same time. Later the tube is removed and a catheter inserted. Finally the catheter is removed and the urine gradually begins to pass normally. The suprapubic wound usually heals well. A many-tailed bandage rather than a binder is used for the suprapubic wound.

Spastic cases.—These are treated by various measures, according to the severity of the case. Abduction splints, massage, injection of stovaine into the spinal canal, crushing of the obturator nerve, modified Förster operation, dividing some of the sensory spinal nerve roots, and a transplantation of the biceps tendon into the patella are all useful at various stages and for differing indications.

The patients are given change of scene and air by means of a spinal carriage, which is really a large, long baby carriage.

Swimming pool.—This is an interesting development in allowing these patients to regain control of locomotion through the sustaining power of water. Patients are put into a small pool three times a week for 15 minutes at a time. The temperature of the water ranges from 94° to 98°. Supported by the water patients can walk without aid when they can not so walk on a floor. Some can even swim. By grasping side rails around the pool, or a swinging ring over the center of the pool, and aided by the help of an orderly, they exercise their muscles and simulate swimming movements.

PHYSIOTHERAPY.

Well appointed departments are maintained in all the military orthopedic hospitals for after-treatment of the wounded by physical measures. The different methods employed include the various forms of water baths, massage, passive movements, active movements, exercises and manipulations, electric-light and hot-air baths, paraffin baths, electricity in the form of the galvanic and faradic currents, ionisation, and diathermy, radium and X-ray. Physical treatment has been found to be a necessary and important adjunct in helping to soften scar tissue and to increase the range of motion in joints and the power in muscles.

Hydrotherapy.—This form of treatment has been found most useful in cases of resistant scar tissue, fibrosis of muscles and joint ad-

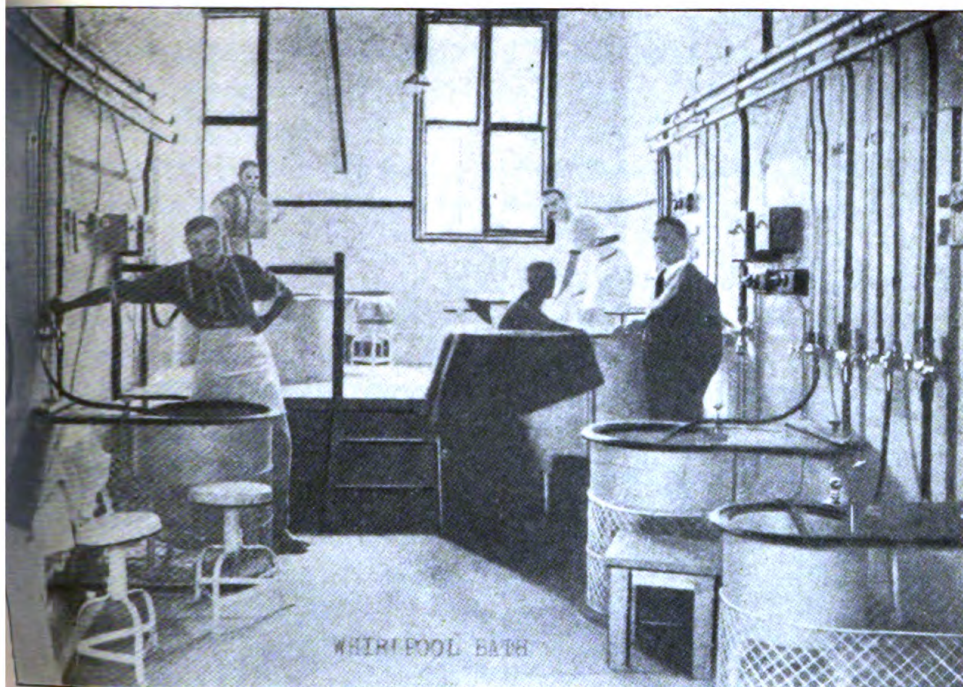


Fig. 42.—From the Handbook of the Military Orthopedic Hospital, Shepherd's Bush, London.

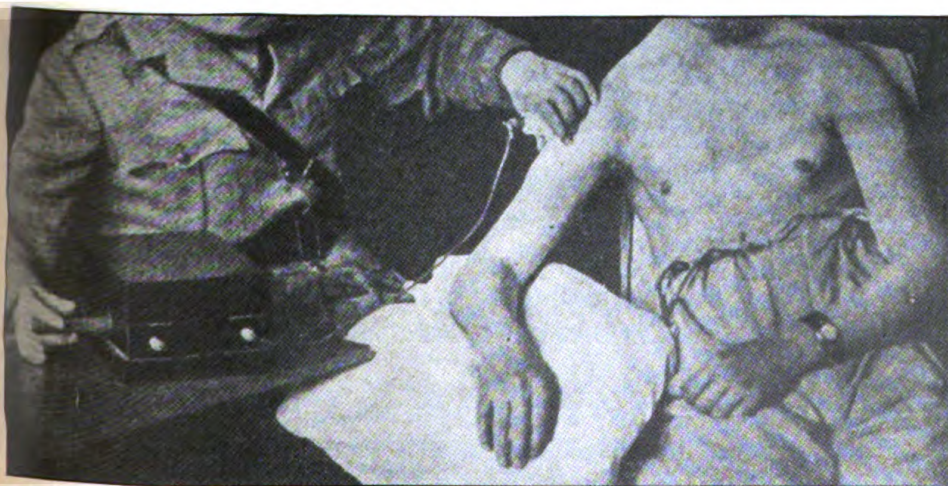


Fig. 43.—Bristow Coil in use. By inserting and withdrawing the core the current is alternately increased and diminished. (From "Treatment of Joint and Muscle Injuries," by W. R. Bristow, Oxford University Press, 1919. By permission.)

98-1

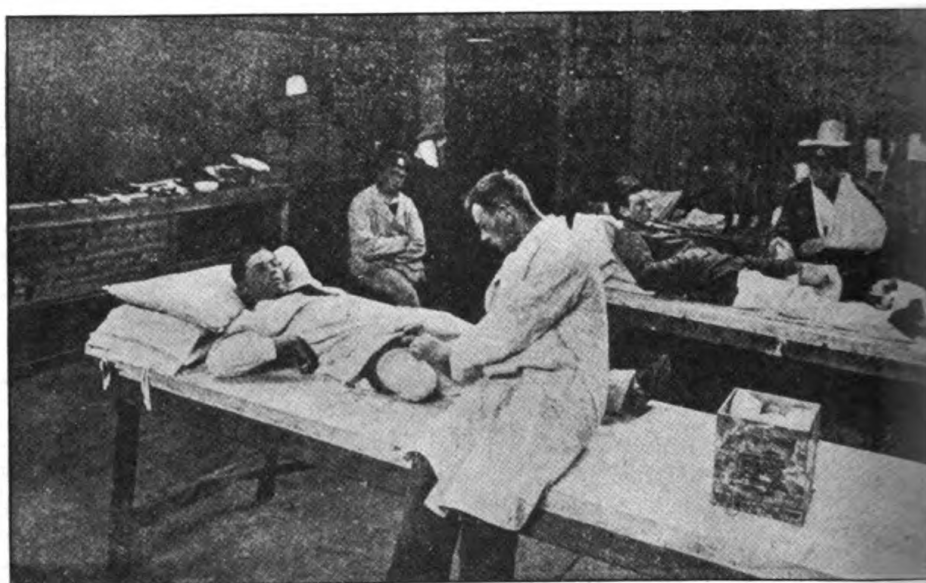


Fig. 44.—Temporary Artificial Limbs Department. From "The Book of Curative Exercise
lished by the Edinburgh War Hospital, Bangour, Scotland.
98-2

Whirlpool baths. It is usually given in the form of the whirlpool bath, in which the water is kept in motion by a running current, by a turbine, or by a current of air. (Fig. 42.) The temperature is kept at about 100°F. and the treatment is given for ten minutes, usually as a preliminary to subsequent massage and electrical treatment. The effects are due both to the hyperaemia produced by the heat, and to the movement imparted by the water. Both active and passive movements are carried out more easily under these conditions, and massage and electrical treatments are more effective if preceded by hydrotherapy.

Paraffin baths.—This form of bath became popularized during the war, although used to some extent previous to 1914. Paraffin is kept in motion by means of hot-water pipes or a water jacket surrounding the tub. It is used at two temperatures, one at 130° to 140°, the higher temperature, and one at 110°, seen only in one hospital. The paraffin bath is agreeable even at what seems a very high temperature. The hyperemia is more lasting than that resulting from hot water, and the film of oil remaining on the skin is soothing and makes massage much easier. Trophic nerve injuries are more easily burned by paraffin than by water baths.

Steam and radiant-light baths.—These baths are found in every hospital but are not used as much as the water baths. The radiant-light baths are generally reserved for the septic and sinus cases.

Massage.—This is used in its various forms with good results in combination with hydrotherapy or electrotherapy. In the larger hospitals the massage and electrical departments have a separate staff. In the smaller hospitals both lines of treatment are carried out in one department. The latter is the more rational procedure because it is usually necessary to combine massage, electrical treatments and passive and active movements to secure the best results. Massage is prescribed for each individual case. With the clinical and laboratory data the case is gone over by the medical officer with the masseuse and the treatment is outlined. Men who have become blind by accident or war make excellent masseurs and are properly trained.

Passive movements.—These are carried out by the surgeon or masseuse in most places. In a few instances Zander machines are used.

Active movements.—In beginning these movements the patient is put through exercises to suit his own individual case. When he has gained some proficiency in using his joint or limb, he is put into a gymnasium class. There is a great stimulus in class work of this sort. After the class work games such as basket ball are played, and the patient often forgets his injured limb and is encouraged to use his muscles to the best advantage. Besides employing the Swedish ap-

paratus found in any well-appointed gymnasium, special exercises have been devised for mobilizing various joints.

Electrotherapy.—This form of treatment usually consists in the administration of the galvanic and faradic currents. The faradic current is used for muscle stimulation when the nerve is paralyzed and the galvanic current when the muscles show the reaction of degeneration. The outfit consists of a simple galvanic switch with a metronome interrupter and a Bristow coil.

This coil is a very satisfactory apparatus for administering induced current. (Fig. 43.) Its distinctive feature is a heavy core, which is inserted into the center of the coil. If the core is pushed into the coil the induced current in the secondary is increased and added stimulation is given to the muscle. When the core is withdrawn the current diminishes and the muscle is allowed to relax. Thus by repeatedly inserting and withdrawing the core the current surges up and down, and the stimulus simulates the natural contraction and relaxation of the muscle. Treatment is ordinarily 10 minutes in length. The masseuse must understand the anatomy of the muscles, their actions, and their motor points. In weak muscles care should be taken that a strong current is not used, since it may pass through the limb and stimulate the opposing muscles which are already strong.

Ionization and diathermy are used in certain special or resistant cases.

Muscle reeducation.—This is being carried out in one hospital following the ideas of Mackenzie.¹ It is contended that active exercise is better than passive, even though the limb can pass through but a small arc of motion. The patient is placed in such a position that the force of gravity is used to assist the movement of a weak muscle. The method in a case of external popliteal paralysis with foot-drag is as follows: The patient lies on his face with his foot hanging over the edge of a couch or table. Here the force of gravity is used to assist in dorsiflexing the foot. When some power has been obtained in this position the patient turns on his side and draws the foot from the floor toward the knee. The next position is to lie on the back and perform the same motion. More muscular power is required in each successive position. In exercising weak shoulder muscles the patient lies on his back in bed and abducts the arm, with the forearm resting on the bed. Then the forearm is raised to a vertical position, finally the entire arm is raised vertically. Not until this movement is performed with ease is the arm allowed to be abducted while the patient is sitting or standing.

Radium.—The emanations obtained from a central radium in a lead tube are used. The radium is contained in minute glass tubes protected by a lead screen. It is used in cases of stiff joints for a va-

¹ Mackenzie, W. C., *The Action of Muscles*. H. K. Lewis & Co. (Ltd.), London, 1911.

length of time up to 45 minutes. The tube is bound first to one side of a joint and then to the opposite side, so that the treatment of the joint requires one and one-half hours. The results of this treatment are not perceptibly better than those obtained with other forms of physical therapy.

Workshops.—These shops are the final stage in treatment of the disabled man. (Fig. 44.) They were designed with the idea of rehabilitation; i. e., by following a certain occupation a man would be enabled to use his crippled limb until its function was restored as much as possible. On the whole this method has proved unsatisfactory, chiefly for the reason that if the man regains the use of a disabled limb it is in an unproductive occupation and one foreign to his trade. Consequently workshops are now run on the productive basis. The man can either pick up his trade anew, or he can train himself in a new occupation. Nearly every conceivable trade is taught under skilled masters, and the interest of the men in their work is everywhere apparent. In nearly every hospital there are shops for automobile repairing and painting, carpentry, metal work, shoemaking, leather work, upholstery, tailoring, and cobbling. In some of the hospitals printing, photography, manufacture of artificial limbs, watchmaking, engraving, hand painting, weaving, basketry, leather embossing, toy making, box making, and farming are taught.

HISTORICAL.

MEDICINE IN ROME.

There was never any system of medicine which could properly be called Roman. From the first the people on the Seven Hills had a very intense political existence and law in all its forms developed rapidly. Everything was subordinated to the good of the state and the expansion of its power. The city's growth, its conquest of Italy first and then of foreign territory, the exact determination of civic rights and obligations and the building up of a strong centralized administration seem to have absorbed the energies of Rome and been the natural outgrowth of its peculiar genius. Roman law has supplied the foundation for many other systems, but Roman medicine came from abroad. It was thought it was essentially Greek and those who practiced and elaborated it were not Romans, rarely Italians even, but from Egypt, Persia, Asia Minor and Greece. Only in the limited field of sanitation and medical jurisprudence do we find anything medical that grew out of local needs and surroundings and was in a sense an exponent of the national character. Even here we see no attempt to meet the requirements of the individual but rather the state's provisions for the growth, perpetuation and well-ordered administration of society as such. Forensic medicine and the public health were less the concern of physicians than of legislators, somewhat after the manner of the Hebrew civilization.

The early Romans were hardy warriors, whose simplicity of life made for health. To be sick was in a way to fail in one's duty, almost a matter of shame. The deformed and crippled were of little account and got little sympathy. Slaves were looked out for because they were property, foundlings and orphans were cared for, being regarded as citizens to be, and there were provisions for sick and wounded soldiers as constituting the defensive and acquisitive arm of the body politic, but one comes across scant reference to hospitals as charitable institutions before the blossoming of Christianity.

Rome was eminently patriarchal and the head of the house functioned as the lawgiver, the priest and the physician for his own. He regulated behavior in health and in sickness prescribed what simple dietetic measures he deemed essential. If more was needed

augurs and soothsayers were called in who could at least afford the grim satisfaction of a prognosis. The great Seneca himself declared that there was occasion only for "a few herbs to staunch the flow of blood or help wounds close up."

In the beginning, however, Rome had its distinctly medical mythology derived in some part from the Etruscans, that people of marvels and mystery. Certain evils were personified in accordance with the inherent tendencies of early man. Thus there was a Febris, Mephitis, a Cloacina, a Scabies. A whole race of minor deities was created, each to regulate some detail and receive special prayers of life unrolled. Mutinus or Priapus stood as a feeble counterpart of the phallic worship of the Phoenicians. Subigus was the tutelary god of the wedding night. Pertunda was the female patron of nuptial embraces. Prema watched over the newly married. Mena looked after the physical condition of women and Cunina cared for children in the cradle. Intercidona and Deverra answered appeals during the puerperium. Rumina beamed on nursing mothers. Both married people and children could pray to Picumnus, who was personified as the woodpecker, and to his brother, Pilumnus of the Pestle. Perfeda was a sort of crude and vulgar Venus, while either Prorsa or Post-verta was invoked from the confinement bed according to the character of the fetal presentation.

Utterly without originality in this domain, Rome later set up temples of Asclepias under the more familiar designation of *Æsculapius* and to the Egyptian Isis and Osiris, as well as to its own Diana Lucina. Long before the Christian era the city was used to the spectacle of religious processions gotten up when pestilence was rife. Effigies of the angry gods to be propitiated were carried through the streets on splendid couches, the ceremonies concluding with a feast on the dainties provided to appease them. In much later times Horace speaks of a virgin to whom maidens in labor could appeal. Bona was the good goddess, typifying chastity and fertility, worshipped by devout Roman matrons, and no man could enter her temple. With the decay of morals it became the resort of loose women and the scene of great license, so that Cicero inflicted a scathing rebuke when he called Clodius the priest of Bona, because he had invaded the once sacred precincts.

As a branch of learning, in its religious aspect, as an active minister to the individual in the home medicine was nonexistent, scant, or impotent. On the other hand, provisions for the public weal were real and effective. The sightseer in modern Rome who wends his way from the Forum past the Temple of Janus to the Tiber may discover on his left hand a portion of the Cloaca Maxima, the great drain superbly built of massive blocks of stone in the period of the

ngs, which still functions as part of the city's sewerage system.aths and aqueducts abounded and to this day the water supply is the best that any capital in Europe can boast. Strict regulations were in force against intramural burial or cremation, controlled the sale of food, forbade to women indulgence in strong drink. From the time of Numa Pompilius abstraction of the living child by a formal section of the dying or dead mother was an established practice. The period of gestation was fixed at 300 days by the laws of the Twelve Tables and this was adopted by Napoleon in his famous code, the basis, by the way, of much of the code of Louisiana. Occasional references in the literature show that many of the district midwives stood in high repute, even as they do in Italy to-day.

With the growth of prosperity and the establishment of its authority abroad the manners of Rome grew softer and foreign notions of refinement and culture, with their inevitable menace to national institutions, replaced the stern republican principles, the stoical and somewhat fatalistic ideas which predominated at an earlier day. Then in a timid, tentative way the Romans began to call upon physicians, though evincing disdain for them as people who took fees and ready at the slightest provocation to become openly hostile to them. The best types of Romans, the members of the "good old families," were slow to trust them or show them the consideration they had long been accustomed to receive elsewhere. The first physicians being foreigners, and usually slaves as well, found it almost impossible to acquire the rights of citizenship. To be despised and suspected was not an incentive to high standards of conduct. In the absence of such standards quackery was sure to flourish, and as they slowly multiplied in numbers this only lowered the physicians still more in the popular esteem.

Cato the Censor could not tolerate physicians. He was a patriot and patriarch of the old school and exceedingly testy and prejudiced when it came to innovation and change. He was an advocate of songs and incantations and compiled a book of tried family recipes such as one can find in those old almanacs so much in vogue a generation or two ago, the lineal descendants of the almanacs of the Middle Ages. He was his own family doctor and distinctly fancied himself as a veterinary. Not only did he fulminate against the country's visible enemy by repeating in the senate on every occasion: "Carthage must be destroyed," but he constantly warned the people against the hidden, subtle menace of all foreign fashions. Physicians, and especially Greek ones, were sure to corrupt the State, and they would use their knowledge to kill off as many Romans as possible! In a letter to his son he strictly enjoins upon him never to call in a doctor.

If there is something laughable in the picture of the old g man pottering about with pomades, ordering poultices of cabbage his favorite remedy—and injecting its juice into sinuses by means of a bladder tied to a reed; if we can not credit the efficacy of grs. iii, leaves of laurel iii, leaves of rue iii administered to a ox, t. i. d. on three successive days, patient and veterinary fasting, still his conduct was neither reprehensible nor contemptible. It grew out of convictions which perfectly controlled both his public and private life. Had Rome only continued to beget men whose morality was ingrained in character and bore fruit in public as well as in private life it would not have gone down under the assault of foreign culture or before the arms of barbarian hordes.

One of the first outsiders to attain notoriety in the city was a certain Archagathus, a medical adventurer whose deliberate pose was to exploit the people. He was immensely popular at first and his office was thronged, but either his surgery was too radical or his mortality too high, or his rapacity ill-disguised, for he was soon banished from the city, owing this dignified mode of exit to the fact that, during the days of his prosperity he had been made a citizen. All his colleagues had to leave with him. Pliny called him “the butcher.”

The next noteworthy figure was Asclepiades of Brusa in Bithynia (128–156 B. C.), who came to Rome a versatile, eloquent, educated and traveled man, thoroughly acquainted with the foibles of human nature, master of a seductive bedside manner, fully satisfied with himself, not easily disconcerted, and well knowing how to put his best foot foremost on every occasion. He was well aware of the fate of Archagathus and handled his patients with gentleness, paying attention to their tastes and humoring their prejudices in countless ways. He abjured cathartics (there is nothing makes a patient unforgiving as the trip too much to the toilet) and kept to enemas and bleeding, though he dared to order an emetic after supper. Instead of the main he trusted to sun, light, air, active and passive exercise (he was only too ready to bid the convalescent ride instead of walk). To preach against drugs and advocate baths, sponging, external visible applications, and a judicious and restricted surgical intervention appealed to the practical Roman mind. Withal he was a brainy, capable, energetic doctor, flavored with a spice of the charlatan, and his success was enormous. He not only expunged the unfavorable impression produced by the “butcher,” but settled once for all the position of the educated physician in Rome. As regards theory he opposed the humoral doctrine of the Hippocratic school ascribing sickness to a disturbed relation of the body's constituent atoms in such a manner as to pave the way for the Methodists, but his enormous success flowed more from practical handling of cases than

abstract notions. (Once, on the street, as the body of a certain man was carried past him on the way to the grave, he had the wit to give that life was not extinct, and proceeded to resuscitate him by the most prodigal exertions and was, of course, popularly rewarded with having raised the dead.)

Asclepiades recommended and perhaps performed paracentesis (he made a most minute opening), scarified the ankles for edema, held that epilepsy might be of traumatic origin, and distinguished between acute and chronic conditions. His fame may be judged by attention he received in the writings of Celsus, Caelius Aurelianus, Galen, and Pliny. The last act of his life, at an advanced age, was to fall down the steps. This fatal accident saved him from the reproach of inconsistency, for he had given out that if one lived properly there was no reason why sickness should carry one off. Asclepiades' famous motto was: "Safely, quickly, pleasantly," a most excellent rule, but so difficult to follow that one suspects this to have been more of an advertising phrase than anything else—something to babble about to admiring idlers at the market. There are doctors to-day who leave in their relatives and friends eager to tell how the patient would have succumbed to convulsions or pneumonia if the physician had not arrived just as he did.

Themison, of Laodicea (about 50 B. C.), is credited with being the founder of the Methodists. It is difficult to summarize their method, but the name itself is suggestive. They aimed to reduce medicine to a simple, orderly, and methodical rule, steering a middle course between the empirics and the dogmatists, avoiding alike perplexities of thought and complexities of treatment, and so combining the merits of each of the other systems. It was against Themison that the great satirist Juvenal hurled the cruel line: "How many hast thou dispatched this autumn?"

The Methodists considered that sickness depended on either a *status laxus* (relaxed state) or a *status strictus* (contracted state), and to be safe they threw in a third condition, the *status mixtus*, which combined the two, or shall we say formed a refuge for the physician who could not decide to which class he should ascribe the symptoms? The *status* in a given case was supposed to be diagnosed by the character of the secretions and discharges of the body, and also pointing out the incriminated organ. Treatment consisted in applying astringents to the relaxed and laxatives to the contracted conditions. In general, acute diseases came under the head of *status strictus* and chronic diseases under that of *status laxus*. Our terms "astringent" and "laxative" are derived from the practice of the Methodists. This practice might perhaps be illus-

trated by the principle on which eczema is commonly treated high science of the twentieth century. During the stage of congestion we all know enough to apply some soothing medicine such as Lassar paste, lead water, and the like. When the disease becomes chronic and indolent we whip it into activity by oil or other stimulating agent. When a balance is struck between two extremes the part ought to heal up or we shall find ourselves as well as the patient in the *status mixtus*.

The astringent agencies employed were cold air and cold alum, lead, chalk, and vinegar externally, and vinegar and decoctions of various herbs internally. In the laxative category were friction with oil, poultices and fomentations, water and vapor, warmth, cupping, bleeding, and, of course, emesis. Themison has been credited with first employing leeches, but is doubtless entitled to the distinction of having been the first to *describe* their use. The Methodists sought to simplify medicine by grouping diseases according to their associated phenomena whereas our ambition is to group by causes. The idea of classification was grossly premature for the times. The simplification was also a meritorious idea, but it led to abuses.

Thessalos of Lydia, who came about 50 years after Themison, was his most famous disciple, carried the simplifying process so far that he undertook to teach his students, and he had an enormous following, all that was worth knowing in medicine in a period of six months. This promise was more in the nature of a boast than of intentional reflection on his system, for he claimed credit to himself for inventing all that was good in it. Thessalos began life in humble circumstances, his father being a wool carder, and enjoying few educational advantages in his youth. He had real talent, energy, and that invincible form of energy known as push which has carried so many to the top of the ladder. With time, Thessalos acquired a lucrative practice in the world's capital and became a voluminous writer, dedicating his compositions to his contemporary Nero, the monster of cruelty and *kultur*. Galen in a passage full of bitterness describes the base methods by which unworthy physicians acquired popularity and classes Thessalos among them, and Pliny has not a good word to say for him, but Galen may have been jealous and Pliny was given to rather sharp criticism. Thessalos certainly was not justified in telling Nero that he had invented Methodism; he was a fool to direct that the title "Conqueror of Physicians" which he had assumed during life should be carved on his tomb on the Appia. Nevertheless he was capable, as anyone will agree who reads his chapter on ulcers and their treatment. His habit of taking his pupils with him to the bedside of his patients for clinical instruction

was advantageous to them even if it was only to advertise the
of those he taught and treated.

From the first century A. D. the habit of bedside instruction
have been fairly general for Martial in his Fifth Epigram

Waiting and immediately you came to me, Symmachus, accompanied by
of students. A hundred hands chilled by the north wind pawed me
I had no fever before but I have it now, O Symmachus!

Asclepiades's physician was Antoninus Musa who cured Augustus
of a disorder of the liver by cold poultices and baths. For
he was rewarded by having his statue set up in the Temple of
Asclepius, by being made a Roman citizen, by large gifts of
money, and the right to wear a knight's ring. There were fashions
as later. The ring on a physician's finger was a novelty but
became established. (Many centuries later the badge of the
physician was to be a gold headed cane preferably with a smelling
stick concealed in the knob to protect against contagion.) Julius
Cæsar who had his own personal physician, started the custom of
honouring the physician and Augustus exempted the practitioners
from taxation. Later Antoninus Pius first reduced the
privilege and finally restricted it to municipal physicians.

One feature of the early imperial era was the proclivity of
foreign men to write on medicine or allied subjects. It is ex-
plained by the now higher educational standards of the foreigners
living in the city. Their knowledge of rhetoric, mathematics,
and philosophy introduced them to the leaders of their time. Cicero,
Horace, and Virgil admitted them to the circle of their friends. But
in the Augustan Age there was still a faint survival of the old
suspicion and a slight desire to be, if possible, inde-
pendent of physicians. Finally, so much of medicine as was practical
and thoroughly intelligible to the layman naturally made a strong
impression on the Roman mind. A great deal of valuable information on
medicine and medical men of their day is derived from these asso-
ciates and friends of the doctors who practiced in Rome.

The poet and satirist Martial (43-104 A. D.) sheds some light on
dentistry as well as the follies of his time. In Epigram XIV
he said: "What have I to do with you? My girl claims me. I am
in the habit of cleaning false teeth." Removable teeth, if not
removable plates, are suggested by the words in Epigram IX: "Lay
down your false teeth down as you do your silken gown." Epi-
gram V implies that false teeth were regularly on the market.

Thais' teeth are very dark, Laecania's white as snow.
Why are they so different, I would like to know?
The reason for the difference easily is shown;
Laecania paid a price for hers, Thais wears her own.

But false teeth were used for cosmetic effect rather than to prove mastication, a most important distinction since mere a chance did not necessitate their being firmly secured. They were fastened to contiguous genuine ones and were made of bone, ivory or boxwood. This form of handicraft may have come from the Etruscans, for there is an allusion in the Laws of the Twelve Tables (5th century B. C.) to the use of gold wire in securing the teeth. This record antedates by a century the arrival of Greek physicians in Rome. Now it is known that the Etruscans used gold in the dentures with great art.

Vitruvius, the great architect and engineer, objected to lead pipes for aqueducts because of the danger of lead poisoning. He attributed goiter to the water drunk in certain localities and associated the importance of high, dry, exposed sites for dwelling with the value of double walls to prevent dampness. Remarkable guess as to the origin of malaria:

It is to be noted that where the ground is marshy small animals and insects so minute that they can not be followed by the human eye, which have access to the body through the air and by way of mouth or nostrils and produce diseases hard to cure.

Vitruvius was one of three official military engineers in charge of the ordnance under Augustus and appears to have been honest as well as extremely capable, for he died poor. He had a huge admiration for the Greeks and prefaces each topic discussed with a résumé of what they had to say, but, being an inferior Greek scholar, usually very obscure in such passages, whereas in all his original contributions he is clarity itself. (One of his inventions was a system of wheels to record the distance traveled by vehicles on land or water.)

The philosopher Seneca, who was an invalid for the greater part of his life, while extremely bitter in his denunciations of the Christians, speaks beautifully of the priceless worth of a physician's ministrations and friendship, declaring that when his fee is paid the obligation remains undischarged.

Pliny, the Elder, a Roman admiral, was perhaps the most industrious, the most indefatigable scholar that ever lived. His nephew has left an account of his ceaseless activity. He read or wrote or studied while riding in his litter, while undressing for the bath; when he came out of the bath; at meals some one read aloud to him; when he retired he had writing materials beside his couch to use in case he could not sleep or woke up with an idea; his "Natural History" is a vast encyclopedic work covering everything that was known in the natural sciences—botany, zoology, geography. He has much to say about medicine and was one of the profession's harshest critics. The French naturalist Buffon said of Pliny that he knew every

there was to know in his day. (As the authority on botany reigned supreme for a trifle of 1,500 years and the scholars worshipped antiquity turned with scorn and malignity on that courageous but well informed teacher of medicine at Padua, Leoniceno, when he dared, in the year that America was discovered to come out in print and declare that not the manuscripts and Pliny only were incorrect but the author himself in many statements.)

He was in command of the Roman fleet at Misenum, near Naples, when Pompeii was overwhelmed by the famous eruption of Vesuvius in A. D. 79. At the first alarm he got under way with his vessels, partly to render what aid he might, but also, of course, to take scientific notes on the occurrence. An unfavorable wind made it impossible for him to reach the scene of the disaster but he got as near as he could and while all around were overcome with terror he calmly wrote down his observations. Later he went ashore and after eating and dining slept soundly until his friends aroused him and told him of the increasing and very imminent danger. Withdrawing into the country he tried to get to sea but found it impossible to put out and was suddenly asphyxiated by the sulphurous fumes.

The most valuable and comprehensive work on medicine, the one which throws the clearest light on what had been accomplished up to this time is that written by Aurelius Cornelius Celsus, a Roman physician whose life stretched from the reign of Augustus to that of Nero. There has been some discussion as to whether or not Celsus was a physician. It would have been most unusual for a member of the family of the Cornelii to embrace such a career, and as the style of the "De Re Medicina" was written for laymen (the points which are vitally interesting to the physician are often brief or handled in a way which a doctor would scarcely have done) and as, finally, there is no reference to him as a practitioner by his contemporaries or successors, the weight of evidence seems to make Celsus not a doctor but a gentleman of learning, deeply interested and most splendidly versed in medicine, who wrote for his own pleasure and benefit and that of his friends. (It has even been suggested that the work is merely a compilation or translation of preexisting works, including those of Cassius Felix, physician to the Emperor Tiberius.)

Celsus was master of a fine literary style and covered the subjects of rhetoric, law, agriculture, philosophy, and the art of war as well as medicine, but these writings are lost to us. Indeed, his book on medicine passed out of sight by the tenth century and the great store of information it contained was not available to the profession it so much concerned until the manuscript was discovered in 1443 by a physician's son, one Tommaso Parentucelli, of Savona (the town which claims to be the birthplace of soap), who found it hidden away

in the church of Sant' Ambrogio, in Milan. (Tommaso Parentucelli eventually ascended the papal throne with the title of Nicholas V. He was a man of vast learning, an impassioned humanist, and will be forever remembered as the founder of the great Vatican library and the rebuilders and amplifiers of the palace of that name and the church of Saint Peter's.) Within a period of 200 years after the invention of printing, Celsus's book on medicine passed through more than 60 editions and was translated into every European language.

The book refers to more than 70 eminent medical men, about most of whom we would know but little, since their own writings have disappeared, but for Celsus. Celsus refers unmistakably to a ligature in these terms: "Veins which shed blood are to be seized at the site of the wound and tied in two places." He was the first writer to recommend nutritive enemata and to group together and fully describe diseases of the heart. In penetrating wounds of the abdomen with injury to the intestine he recommends that the gut be sewed up and that in closing the parietes the peritoneum be occluded. Celsus transmits to us an excellent picture of the degree to which surgery had progressed in his day. Needles were of ivory and bone. Ligatures were principally of linen thread. For washing out the ear there was a syringe with plunger. It was used for removing foreign bodies when these would not come out by the employment of sternutatories. If healthy omentum protruded from an abdominal wound it was to be replaced, but if it was black and gangrenous it was to be cut off with shears. The trephine was to be wet to prevent overheating. The drills used on the skull had guards to prevent their slipping and penetrating too far. The trephine was made in two styles. One had a central perforator; the other did not. Cups for bleeding were of bronze or horn. The former were operated by means of a bit of burning lint. The latter were provided with a small aperture by which suction was made with the lips. It was then dexterously occluded with a bit of wax. In fractures with protruding bone the rough ends were to be filed off.

We owe to Celsus a description of the arrow extractor invented by Diocles. It consisted of a long-grooved piece of metal with hooks at one end to pull by. At the other end the sides gradually curved up and met in a sort of beveled point, back of which was a perforation. The plan was to so manipulate the instrument that the arrow head would engage in the perforation and the barbs be sheathed by the rolled-over edges. Celsus mentions a lithotomy scoop on a very narrow stem for introduction into the bladder. Fistula was treated by the knife when there were diverticula, but otherwise was cut through by a ligature tightened a little more each day.

Autotomy was only to be performed on subjects between the ages of 14 and 14. He tells about drilling out carious bone.

It is clear from the foregoing that surgery had advanced far by this day and we shall see later how much was swallowed up in darkness of the Middle Ages. But there was to be still further progress before the submergence of professional knowledge in the sixth and seventh centuries, and when medicine emerged from the dark tunnel of the Middle Ages a great many things were "rediscovered" that the world had merely forgotten.

A precursor of Celsus was Heliodorus, one of the great surgeons of the Roman period. He practiced both torsion and ligation, using forceps to pick up the vessels; was particularly able in the treatment of wounds and injuries; performed amputations with method and caution. He made flaps, next divided the soft parts at a distance from the vessels, went through the bone and was then ready to pick up the parts.

Sorbonius Largus, who in the capacity of army surgeon accompanied the Emperor Claudius on his expedition to Britain, deserves mention because of his honesty, his struggle against the decadence of his times, his energy in the collection of data about drugs. In his *Treatise of remedies* he quotes from historical documents and also many secret formulæ obtained by bribery from the physicians of the day. He himself made no secret of what he knew and placed the satisfaction of knowing ahead of love of glory and held that to restore health and preserve life approximate to the gods. The date of his writings is fixed by the reference to a dentrifice "which Messalina, mother of our divine emperor, uses."

Placius Dioscorides was a Greek in the military service of Rome under Nero. He collected specimens of crude drugs in Greece, Asia Minor, Italy, and Southern France. He gave a description of some 600 plants or their active parts with name, synonym, habitat, and salient characters so that some of them can be identified today. His pharmacopœia included, among many other articles, whey, opium, ox gall, sugar, aloes, fern, white lead, copper sulphate, and mandragora. The latter substance was the anesthetic of the period, and Dioscorides specifically recommends it either as a subcutaneous injection, or inhalation. It was also the main ingredient of the soporific mixture used in the Middle Ages. Until the seventeenth century Dioscorides remained the basis of all works on medical botany. His book was one of the early outputs of the printing press, being published by Aldus in Venice, 1499.

Athenæus of Attalia founded the school of Pneumatists, who entertained special views about the *pneuma*, air, breath, or soul which

enters the body by way of the lungs and is distributed to the heart where it cools the blood derived from the liver. Athenaeus was famous in his day and, however defective we esteem his physiology, we can not pass him by since his theories influenced the medical world profoundly up to the days of Vesalius and Harvey. He studied the pulse very closely and ascribed it to an automatic expansion of the *pneuma* or spirit in the vessels. This reminds one of the old Japanese fancy that it was caused by the knocking of spirits within the body. Athenaeus wrote on hygiene and sanitation and gave specific directions regarding the filtration of water.

Aretaeus of Cappadocia is distinguished for a high sense of his calling and for the excellence of the style in which he expressed himself. In these respects he resembled Hippocrates. One of his works contains a touching passage describing the painful duty and also the privilege of the physician when he recognizes the hopelessness of a patient's condition and has nothing left save to sympathize and console him. Very little is known about the life of Aretaeus. If he is accepted as the author of the works ascribed to him, he must have been a master clinician. His aim was to make diagnosis more exact and treatment simpler. He was a close student of nervous diseases and appears to have differentiated between spinal and cerebral palsies. Diphtheria, elephantiasis, pneumonia, and diabetes are well portrayed by him. It is to be remembered, however, that the ancients did not know of sugar in the urine. Diabetes for them was a group of clinical symptoms and did not include the phenomenon presented by the contents of renal output. Aretaeus's description of how to interrogate a patient regarding his mental condition is a marvel of simplicity and acumen.

Recent investigation has thrown much doubt on the authenticity of the writings of Aretaeus, and the trend of opinion is now to give to Archigenes the credit which Aretaeus formerly enjoyed. Archigenes was a Syrian surgeon of great ability who did amputations by the flap method, employed the actual cautery but also acupuncture and ligature for the arrest of hemorrhage. For everyone but the accurate scholar the question of names is of little moment. The significant fact that this or that measure was known and used for the benefit of mankind at a given time is enough for the purposes of this paper.

Rufus of Ephesus lived in the time of Trajan and had been trained in the schools of Alexandria. Very little of his written work has survived, but we know about him from the references of others which establish his achievements in various branches of medicine. He did much dissecting of monkeys and bitterly laments that animal dissections and surface demonstrations on slaves were all that survived of genuine anatomical dissection and study of the human body. Rufus appears to have been a broad-minded and versatile

His sound judgment is shown by his disinclination to use a catheter in acute vesical conditions; his objection to diuretics in inflammations of the kidneys. He practiced bimanual examination in diagnosing calculus, and in doing lithotomy used an instrument with a blade at one end and at the other a roughened handle to catch at the tip, so as to extract the stone after incision. He was a sanitarian and gynecologist. His colocynth pill enjoyed popularity for ages. It is said that he once cured a patient of the delusion that he had no head by requiring him to wear a hat made of lead. In a notebook which he composed for medical students he catalogues and names the different parts of the body.

Another native of Ephesus—it is to be noted that we are approaching the millennial year of Rome without finding but two or three Greek or Italian names among the distinguished members of the medical profession—was Soranus, also a graduate of Alexandria. But he was even far greater than his school and its average product. Alexandria was no longer in its prime, but here was one of the greatest and most original men of Græco-Roman medicine. We possess, unfortunately, two books of his dealing with obstetrics, gynecology, and pediatrics. The rest of our knowledge of him flows from what others have said about him or quoted from him, but the references fully justify his title of “prince of physicians.” First of all, as illustrating his superiority to the bondage of tradition, it should be noted that he sought something better for suffering and disabled women than the crude and violent methods in vogue before his time. He sought something more efficient than the suggestion therapy of charms and amulets. He abandoned the barbarous measures previously employed for accelerating labor and expelling the placenta, fully realizing the hazards they involved. His writings describe clearly the version, the appropriate treatment of a prolapsed arm, traction on the child, external pressure to reinforce uterine action, artificial rupture of the membranes, and the knee-elbow position. Soranus gives rules for the selection of a wet nurse and outlines the diet of an infant when weaned. Alkaline washes are recommended for the removal of vernix caseosa, and the eyes of the new born are to be scrupulously cleaned. The cord is to be cut with a knife after double ligature previous to the expulsion of the placenta. He allowed nothing but a little honey for the first two days, and the child was put to the breast on the third. Where delivery jeopardized the life of the mother he did not hesitate to destroy the life of the child. He made examinations both manually and by the speculum.

Soranus was a good general surgeon and physician and laid great stress on the importance of accurate diagnosis. Best of all he fought manfully against ignorance and superstition wherever he found. beginning with what has always been its stronghold, the

lying-in chamber. Thus he cautions midwives against allowing a attempted interpretation of dreams, any mysteries or religious a to interfere with legitimate treatment and the strict carrying of orders.

To Soranus is due the first detailed description of the vaginal speculum. This was the large or *Speculum magnum*. Specimens have been dug up at Pompeii and are to be seen in the Naples Museum. They have a cross bar and screws for opening and closing. Soranus tells how, after warming and greasing, the instrument is to be painlessly inserted and withdrawn. He had a method of using a shawl to keep the patient's thighs flexed on the abdomen in the lithotomy position. Its center was under the patient's neck. The ends went to the arms, forming a noose for each and then passed under each thigh and were secured to the wrists. He employed vaginal fumigations for vaginal and uterine disorders but recognized the liability of causing a burn. A large jar with the material to be volatilized could be sunk in the ground for the patient to crouch over or a smaller silver or bronze vessel armed with a silver tube for insertion into the vagina could be used if the tube was carefully covered and cooled. He employed the cephalotribe, the uterine sound, the embryo hook and a special cranial perforator. Sponge tents were for the arrest of uterine hemorrhage. His pessaries were balls of wood. Bronze pessaries have been unearthed at Pompeii. They have a sort of rim or flange with perforations for stitching to a band and strapping in place.

Between Galen who refers to him and Archigenes whom he quotes may be placed, in point of time, the great surgeon of antiquity Antyllus. We know about him chiefly through the writings of Orribasius. His name is known to every student of anatomy and surgery from his method of treating aneurism, which was to tie above and below and open but not empty the sac. He resected the bones of limbs and removed portions of the upper and lower jaw. From the remotest times cataract had been treated by couching. Antyllus removed cataract by *incision* and suction. His treatment for ectropion was to remove a triangular section through the entire thickness of the eyelid. In tracheotomy his incision was between the upper rings of the trachea, but he held the operation unjustifiable in diseases of lungs and bronchi. In everything he was far-sighted, painstaking, and accurate. We learn from Galen that he got his linen sutures from a special shop in the Via Sacra, where Galen himself lived, between the Temple of Rome and the Forum, hardly by the Temple of Peace.

Under the Empire the physicians were members of a well-organized guild. Instruction was wholly by individual preceptors who

eived a fixed honorarium from each pupil. Severus assigned a
ary and rooms for teaching physicians. The imperial laws pro-
led special privileges and exemptions for the profession and this
turally encouraged people to embrace it. Hence it was soon over-
dowed and included a host of specialists, the curse of medicine
ere its range of knowledge is limited. The capital swarmed with
rists and oculists, with gynecologists and genito-urinary artizans,
æders, curers of fistula, and men operating in still more restricted
lds. All the abuses which exist to-day in spite of opposition and
striction flourished then, ridiculed but unhindered. Among repu-
ble practitioners jealousy, wrangling, and slander were rampant.
he dregs of the profession were composed of drug collectors, abor-
onists, panders, and debased creatures who for proper compensa-
ion would furnish and introduce a tampon; would kill or expose to
lie a new-born infant. Of the semirespectable specialists those
reating diseases of the eye were most numerous and they called
down upon themselves constant ridicule and criticism. Trachoma
appears to have been very common in the later Roman armies and
bottles for collyria and boxes for ointment, inscribed with the nature
of the remedy and the directions for use, have been picked up on the
sites of old Roman camps in many parts of Europe. The most
frequent ingredient of the eye salves was carbonate of zinc. Some
of the eye-salve boxes were made with considerable art and there
is in the British Museum a gem bearing the figure of Minerva with
which a physician used to stamp the boxes he dispensed.

Originally physicians dispensed their own remedies and their
offices were lined with boxes and jars often decorated in the most
exquisite style. This in a way made the physician personally re-
sponsible for his medicines and guaranteed their purity. With the
expansion of the pharmacopœia, an intermediary between doctor
and patient became necessary, but the first so-called druggists were
not, by a good deal, the most ethical people in the world. The apoth-
ecaries of the Middle Ages inherited from antiquity a very bad
name and as soon as definite legislation began to be enacted regard-
ing medicine we find also the most stringent laws to control the
unprincipled tendencies of the collectors and dispensers of drugs.

Society was becoming more and more corrupt and there was no
lack of servants to minister to its vices. The reigns of such men as
Antoninus Pius, Marcus Aurelius (his son Commodus was the per-
sonification of evil), and the three other "good emperors" did not
stay the decline of the State or the degradation of the people and
medicine participated in the general disintegration. The decay of
intellectual life was marked by a revival of superstition, mysticism,
and magic. Demonology returned. The amulet and incantation

became the rage. Rhyming recitations, mystic signs, the repetition of meaningless words, unintelligible mutterings over broken bones or festering abscesses replaced the well-meant, if often misguided efforts of thinking men to cure them.

Of course rational medicine had never wholly displaced superstition, but certain follies had gradually become the earmarks of the ignorant. When Rome became corrupt those in high places descended to the level of the low and vulgar. The dictum of Christ that the "pure in heart shall see God" and its converse was never better illustrated. Coarseness and depravity obscured vision and made imperceptible the pure rays of truth. Neuberger has suggested another and excellent explanation of the demoralization of medicine. The Romans believed strongly in every man's knowing something of treatment. This was distinctly a Roman idea and not a personal peculiarity of Cato. Varro considered a knowledge of medicine part of a good education.

Gellius, who whiled away the dull winter evenings in Attica and later in Rome by composing under the title of "*Noctes Atticae*" a sort of gossiping description of the events of the day, laid emphasis on the value of familiarity with health measures. Self-doctoring had by now grown apace, a natural result of dabbling in the subject. Some of the physiology in our school textbooks and the startling medical discoveries of the daily press illustrate for us the danger that comes from tasting instead of drinking deep from the Pierian spring. It became the fashion in Rome to think less of the nature of a drug's action than of its cost and source. If it came from a distance, was hard to procure, smacked of the supernatural, it was inevitably regarded as more valuable than the simple remedy given in good faith for what it really promised. In Greece, now a province of Rome, the Asclepieia had been revived and the priests were always conscious perpetrators of fraud. They called to their aid the hangers-on of medicine whose smattering of knowledge and utter lack of conscience made them valuable assets to miracle workers. Rome, the trunk, felt the poison distilling in its branches. It adopted the rites of Baal or Astarte and preferred them to reviving its own observances. The occult and transcendental fastened upon the soul of man. Strange creeds, strange worships, strange and unheard of treatments, drugs with foreign names—the passion for all these sprang up and attacked men like a blight.

Such were the conditions which prevailed, though the evils mentioned had not reached the pitch they eventually attained, when there came upon the scene a man whose ambition it was not only to improve and enlarge the scope of medicine, but to stabilize it. He succeeded, and more particularly in the last-named particular. The oscillating and uncertain views that characterized medicine before his day be-

came so crystallized and hardened that for more than 1,300 years after he had developed his system there was no change. To suggest any departure from what he had laid down was a medical heresy. To dissent from his teachings invited inquisitorial action by guild and faculty. So late as 1559, a certain English physician, Geynes by name, was hailed before the London College of Physicians for having impugned the infallibility of Galen and was not restored to favor until he had recanted in writing.

Claudius Galen was born at Pergamus, a Greek city of Asia Minor, in the year 131 A. D., in the reign of Hadrian. His father, Nicon, an architect, was a man of means and culture who provided liberally for his son's education, and was in fact his first instructor. Galen always spoke of him with appreciation and affection. He probably felt differently toward his mother, who, though a model of chastity and a splendid housekeeper, was a woman of such violent and ungovernable temper that in her fits of passion she would shout and scream and even bite her maid servants. Galen studied rhetoric, philosophy, and mathematics until the age of 17, when he began the pursuit of medicine under local teachers. Pergamus had at this time a new and thriving Asclepieion which attracted many invalids, so that the clinical field was large and varied. The city boasted a number of good physicians and at least two anatomists of repute.

On the death of his father, Galen immediately started on his travels, and was gone for nine years. A goodly proportion of this time was passed at Alexandria, but he also visited Corinth, Smyrna, and the principal cities of Asia Minor. This travel habit was a part of medical training and continued well through the Middle Ages. With Galen, of course, there was another factor. He was a nomad born, and kept on the move all his life. It is scarcely to be believed that even if he had lived in the age of printed books and huge medical libraries he could have kept still.

Galen came back to his native city at 28, and secured an appointment as surgeon to the local association of gladiators. This position, held for four years, afforded the young doctor the needed opportunity to practice surgery, and he is said not to have lost a patient in this category. His treatment of wounds was to apply dressings soaked in wine. Pergamus, however, was not a broad enough field for the ambitious, and we can readily conceive that Galen had been for some time chafing at the restricted opportunities of the provincial city, since he found in a serious riot which broke out there a sufficient excuse to depart.

Rome was the loadstone that drew to itself all men desirous of winning fortune or leaving a mark on their day and generation and

thither Galen now betook himself and soon embarked on such a career of success as to provoke the jealousy and hostility of those who had long toiled and waited in vain for the important connections which the newcomer so quickly established. Galen appears to have been sure of himself and not wholly above certain little tricks of the trade well calculated to enhance his prestige. He liked to make a diagnosis and give a prognosis with certitude and promptness. He could state at his first visit whether the patient's fever was tertian or quartan. Some of his startlingly rapid and rapid cures were hailed by his enemies as evidences of magic.

Galen had promptly taken up the study of anatomy and physiology on coming to Rome and was wont to invite his friends and various and sundry persons of importance to be present at his dissections. The comment provoked by these séances naturally added fuel to the flame of envy and hatred entertained for him by his colleagues. Perhaps it was not so much because of the appearance of plague in the city that after four or five years residence he returned to Pergamus as because of the persecution to which he was subjected in Rome. But he assigned the plague as the reason for his departure and has been subjected to no little criticism on this account. On the other hand he has been defended by those who claim that as an anatomist and physiologist with definite and extensive researches in view he was fully justified in withdrawing from danger. The rival demands of science and humanity are not always easily conciliated, but as we look back on Galen's science, only to admit that it was mostly erroneous, it is hard not to feel that it became him first of all to play the man, and we wonder if a single sound discovery regarding the contagion then raging might not have outweighed what he did with his cutting up of apes and an occasional human cadaver. De Chauviac, the French surgeon of the fourteenth century, was no way the equal of Galen in talent or originality, but his faithfulness in sticking at his post through two invasions of pest at Avignon, though he admits that he was badly scared, has left a gleaming example of moral heroism that outweighs for posterity many a discovery.

Galen had not long reestablished himself at Pergamus before he was summoned to Aquileia, near Trieste, to serve with the army under the joint emperors Marcus Aurelius and Lucius Verus. Here, too, the plague made its appearance, and the mortality soon ran so high that a return to Rome was determined on. Lucius Verus died on the way, and on reaching the capital Galen escaped further demands for campaigning by an assignment as personal physician to the son of the surviving emperor. It is said that Marcus Aurelius would have liked to take Galen with him when he started again for

Germany, but he alleged in excuse that he had been warned in a dream by Æsculapius not to leave the city. He preferred, however, to live near rather than in Rome and spent most of his time on one of the estates of his princely charge. He seems to have been successful in the capacity of court doctor, and Faustina, beloved but unworthy wife and the devoted mother of a monster, spoke of him with unstinted praise. It seems probable that Galen did not resume his travels for another four or five years, remaining on duty with the imperial family until the return of Marcus Aurelius. The details of the remainder of Galen's life are the subject of controversy, but in spite of more or less constant ill health he appears to have lived to be three score and ten.

Galen was extremely well pleased with himself and supplied deficiencies in his acquaintance with physical facts by assertions based on reasoning. Because he was really a great man; because he had many honorable traits and a mind open to the sublimest thoughts we could forgive him his inordinate conceit, his supercilious attitude to others, his assumption of much that he was not entitled to but for one circumstance. He fastened upon the profession the vicious habit of reasoning about a thing instead of studying it in the light of a natural phenomenon. When we recall that Galen was a professed admirer of Hippocrates and his most capable and devoted exponent it seems strange that he should have departed so radically from the very essence of the Hippocratic method, and surely history surely affords a better example, unless it be in the case of Napoleon Bonaparte, of genius warped and invalidated by egotism.

Galen came at the end of a period and on the eve of a great obstructing wave. He aimed, almost as if conscious of his position at the time, a consciousness rarely accorded to man, to garner in and preserve all that was best in what had come before him, to add to it by his own labors, to prune it of the doubtful, contradictory, or false, and to bequeath it to his successors as a complete and harmonious system of practice and medical belief. It was a stupendous task, but not above his powers. Galen was theoretical in spirit, while Hippocrates was practical, but Galen had a vastly greater range of knowledge and it is not entirely his fault if his prestige so imposed itself on succeeding generations that he was actually a stop to progress. Without him the world would have had to begin all over again, repeating the many mistakes that marked its slow development up to his time. The price paid was, of course, the perpetuation also of much error, for some of which he himself was to blame. Galen had the wit and the audacity to settle everything. The medical world supinely accepted his dictum and went into hibernation. Thereafter if a treatment, diagnosis, or prognosis was

contrary to the common sense of some stout observer no demonstration could sustain him if he was not in accord with Galen. A method might kill its thousands, or its tens of thousands, but if it was according to Galen it was right and the fault lay with the obduracy or stupidity of those who *would* die.

With this general survey of his life, character, and purposes we may pass to a brief consideration of what he actually did to enlarge medical knowledge. He was the last and greatest anatomist before Vesalius. He speaks with enthusiasm of two occasions when he was able to study a complete human skeleton, and he was in the habit of urging students to go to Alexandria as the only place where anatomy was really taught properly. Galen did much dissecting of apes and swine and may be said to have founded physiology, even though Galenical physiology itself was no great thing. He was the first to offer a rational explanation of the mechanism of respiration. He described seven pairs of cranial nerves and conceived something of the function of the sympathetic ganglia. He made sections of the recurrent laryngeal nerve and of the spinal cord and described the resulting paralysis. He dissected the brain and described its principal gross features, such as the dura and pia mater, the corpus callosum, the third and fourth ventricles, and the base. He constituted the liver the great blood organ of the body and taught that the blood starting from this fountain head entered the vena cava inferior and went to the belly and lower limbs; or else by the superior cava to the head and upper extremities, after passing, as an incident on its way, into the right auricle and ventricle whence a small portion was diverted to the lungs for their nutrition. Some of the blood in the right heart transuded into the left ventricle and was there mixed with "vital spirits," thence to attain the arterial system as air and blood. Galen thus recognized that arteries had blood in them and that the power of the heart was active in them since the pulse was perceptible on the proximal but not on the distal side of a ligature. With all the errors of this theoretical schema it nevertheless was a huge advance over any previous one, and it survived unchanged until Harvey, or at least until those lesser lights, Servetus, Columbo, and Cesalpino, who heralded his coming.

Galen was unfavorably disposed to mineral substances and added enormously to the list of vegetable remedies in the pharmacopoeia. If his surgical notions regarding suppuration were erroneous, yet, on the other hand, he seems to have been a good man in internal medicine and to have been sound in his therapeutic measures. He recognized phthisis as an infective process and his treatment of it seems singularly modern, inasmuch as he advised a milk diet, high, dry

altitudes, and sea voyages for its cure. We get from him the classic signs of inflammation—heat, redness, swelling, and pain.

In a single paragraph of one of his works he refers to the rectal and uterine syringe and to the bladder injector or catheter. His writings mention the blowpipe, the saw, the lancet, the bellied surgical knife, the drill having guards to prevent its going too deep, the raspatory, wooden spatulae, male and female and S-shaped catheters, and the bronze mortar and pestle. He tells how the heated razor may be used for cutting and at the same time arresting hemorrhage; how a tooth projecting above its fellows should be filed down; how a scoop may be used to remove foreign bodies from the ear; and if this does not succeed how to effect an entrance behind the ear by incising back of the auricle. Wool sutures are alluded to, and Norica is stated to be the best source for steel for making knives.

Galen was a tireless worker and writer, and had no rival in antiquity as regards the mass of material collected. Though they are not those generally accepted by science to-day, his beliefs about creation, the Creator, and the relation of one to the other are exalted and beautiful. He was not a Christian, but he was monotheistic and ascribed to the Deity all wisdom and all power. In his book *De usu partium* he argues strongly for design in nature. There is the true idea of worshipping "in spirit and in truth" in his words:

Let true piety to consist not so much in sacrificing a hundred bulls or pouring out rare perfumes as in recognizing and leading others to recognize that great is the power, wisdom, and goodness (of Him who created us); that He has ordered and arranged all things in the manner most conducive to their mutual preservation.

Whether or not he practiced what he preached, Galen spoke from good text when he said:

He who esteems riches more than distinction and who learns his art to amass wealth will never attain the end which medicine proposes to itself. It is impossible to covet riches and at the same time to cultivate worthily the noble art of medicine. If one is pursued with ardor, the other is neglected.

The following notes and the allusions to surgical instruments already made under the biographical sketches are derived almost wholly from the scholarly work on the subject by the late J. S. Milne, M. A., M. D., of the University of Aberdeen.

In general the scalpel and the bistoury, the knives of antiquity, differed very little from those used by us, the individual surgeon having, of course, his preferences as to the length of the cutting edge and the amplitude of the blade. The blade was usually of steel

soldered to a bronze handle. For this reason more handles than blades have survived. The bronze of Egypt contained $7\frac{1}{2}$ per cent tin. Some of the instruments unearthed at Pompeii have brass handles. It was apparently exceptional to make solid instruments of one metal. Like the scalpel and the bistoury, the probe was universally employed and might be straight and sharp or rounded and either rough or smooth at the end. The Roman probes, like the handles of their knives, were often embellished with carving or inlaid work, a serpent design being a favorite one for probes. For some unknown reason the cautery, the most popular and generally employed instrument of ancient times, has almost entirely disappeared. The richest antiquarian find rarely yields a single specimen.

One of the oldest cutting instruments is the razor, and the forceps for removing hairs also has a very remote origin. Both have been found in the lake dwellings of Italy and Switzerland. Aristophanes in Greece and Juvenal in Rome mention epilation. Juvenal speaks of removing pubic hairs. The practice persisted in Egypt up to the Middle Ages, if we may believe the narrative of a traveler of the sixteenth century, who describes minutely how scrupulously the women of Egypt attended to the toilet of the pudenda, removing hairs, bathing and perfuming the parts to avoid foul odors and pediculi and to render themselves "dearer to their men." Somewhat similar practices appear to have had a limited vogue in France and Italy.

The lancet for bleeding goes back to remotest times and so does the instrument for cupping. The earliest form of cup was probably a gourd, the terms *cucurbita* and *cucurbitula* being used by Juvenal and Celsus, respectively. The earliest cupping device may have been a horn, as this substance was long a favorite one for the purpose. Naturally, however, bronze was more convenient as it would not be damaged by burning flax or tow. As already stated, the first syringe was a bladder to which was fastened a bit of cane or horn, a quill and finally a properly fashioned tube of metal for a nozzle. Antyllus mentions a *glass* as well as a horn nozzle. Dilators and sounds made of tin, wood, and lead existed from or before the days of Hippocrates. Needles were of bone, ivory, or metal. In the main, sutures were of linen, but Galen mentions wool and Paul of Ægina mentions horsehair.

Practically all the simpler bone instruments were used from the days of Hippocrates—trephine, elevator, drill, and raspatory.

As all the early physicians were great travelers they, of course, needed a container for their instruments. A commemorative tablet of stone in the Temple of Æsculapius at Athens bears a carving of an instrument case, singularly modern in appearance, containing a number of scalpels lying side by side with a neat frame to hold them

place. Such cases were employed in the fifth century before Christ and evidences of similar devices of a later date have been found at Pompeii, in France, and in the ruins of the great Roman military hospital at Baden. Four of the rooms at Baden have been systematically explored. They contained tiles, lamps, jars, spears, darts, and buckles. At a lower depth were excavated 120 probes, many ointment spoons of bone and bronze, portions of catheters, powder and ointment boxes, needles, ear scoops, spatulae, cauteries, and containers for instruments.

From the second to the fourth century it was a Roman custom to bury personal effects with the dead and hence physicians were interred with their instruments beside them. The tomb of the third century oculist, Severus, buried at Rheims, contained a drill, the handles of several scalpels, 8 handles for needles, 5 hooks, blunt and sharp probes, 7 forceps, 2 balances, a mortar, spatulae, a medicine jar and seal, all of uniform pattern and beautifully inlaid with silver. The drill in question is supposed to be of the type described by Aetius for perforating the nasal septum in lachrymal fistula. Similar tombs of physicians have been found elsewhere in France, but the excavations in the buried cities of Herculaneum and Pompeii have yielded the most valuable information on the subject. The great museums of Europe contain examples of specula both "large" and "small," knives of all sizes, medicine and ointment boxes made of ivory or bronze with carved figures of Hygeia or Æsculapius, probes and the stone slabs on which drugs were worked up. The most salves were usually dispensed in marble boxes.

EDITORIAL.

THE NEW YEAR.

The year 1920 will mark the tentative unfolding of one of the most radical and far-reaching innovations ever undertaken in relation to the Medical Corps. Steady! Read no further if your first thought is of selection for merit, increased rank and pay, the substitution on the uniform overcoat of tarnishable gold buttons for the black ones so unaffected by rain or showers of salt spray. These are trifles light as air compared to any carefully matured, well-considered plans for making the service attractive to the type of man we need and for holding such a man once he has been secured.

There are to-day and there always have been and doubtless always will be a certain number of high-grade men who in spite of the small pay and large drawbacks find the Medical Corps of the Navy a *milieu* in which they can lead happy and essentially useful and very worthy lives. The happiness and usefulness has in the main been due to a combination of circumstances and considerations making the hard service life endurable and something more than endurable; but these circumstances and considerations were not the result of effort from within. They were fortuitous as far as the Navy and the Medical Corps were concerned. If a man's prospects in civil life were not brilliant; if he was poor; if he had few social or professional connections; if he dreaded the trying apprenticeship of general practice; if he was repelled by certain aspects of the business side of medicine (there is such a side); if he suspected himself of lacking those peculiar temperamental qualities, those traits of character which so largely underlie material success and are so necessary to give a marketable value to his attainments; and finally if he had a keen love of travel and adventure and was strongly tinctured with the spirit of the nomad he felt drawn to the service, or at least was not repelled by what he heard from friends and counselors ashore.

We know that we have a fine corps; we know how much earnest, faithful, and in every way commendable work goes on in the Navy medical department year in and year out—scientific, honest, important work—which “vaunteth not itself, is not puffed up” and is very largely ignored outside of the corps and outside of the service. On the other hand, if we have had the courage to look the truth in the face we are aware that to the generality of civilians the Navy surgeon

passes for an unambitious, gentlemanly, perhaps entertaining fellow, with a smattering of knowledge which from its range is assumed to be superficial except in the diagnosing of syphilis and the examination of recruits.

The damning word in the description is *unambitious*. Say to a young physician at the great turning point in his life, when he is selecting his field of work, that a given course offers no scope for ambition; that a particular group of men are without ambition, and you have taken the most effective step possible to divert him from that course and to make him draw away from that group of men, however attractive they may be in a multitude of ways. The scant pay may keep out some desirable men but the prospect of a considerably better salary than now obtains would not counteract a deep rooted conviction that the service offers no real professional future. Now, any man who has worked hard in the service for five years, who has had the initiative, the patience, the determination necessary for real achievement in civil life, and who is deploying in the Medical Corps as much energy and ability as are requisite for conspicuous success elsewhere, knows very well that he has a chance for distinction in the Navy.

The trouble is that this is not easily demonstrable to the outsider. We point to those of our corps who may be said to have "arrived" and are answered by the statement, "Yes; but my talents, my tastes, and my inclinations do not run along those lines." We name another medical officer of considerable distinction and receive the same reply. Again it is sometimes objected, and this is far more serious, that the chance for a start toward the top is not open to all. Perhaps, in the past, it has sometimes been true that duty of a kind to furnish incentive and opportunity for forging to the front has not been open to all but depended on attracting the personal notice of some one vested with large powers. It is certainly true, however, that in the past there was no very definite and permanent provision for giving special opportunities to the deserving, and too often those who were willing to pay out of their own pockets fees for special courses and were prepared to deny themselves the hard-earned leisure hour in order to qualify by outside study and labor for positions demanding unusual and specific qualifications received no official recognition and scant encouragement.

There is in session now at the United States Naval Medical School, Washington, D. C., a class of some 20 or more young medical officers, brought together somewhat at random from those made available by reason of service conditions and requirements of service, for special instruction, training, and observation. Of this number, a select few who give reasonable promise of justifying the time, labor, and expenditure of funds involved will be detailed for further courses at

Rochester, Minn., at the New York Eye and Ear Infirmary, and elsewhere, which will permit them in time to qualify as specialists in surgery, in eye, ear, nose, and throat work, as internists, etc., in our naval hospitals and on board our hospital ships.

The medical officers who were invited to nominate eligible men for this first unusual session were in some cases rather lukewarm in the matter and the scheme was not advertised nor bruited about, but a beginning has been made, and if it meets at first with the opposition of indifference or mild scorn from hospitals that follow the ruts of old custom (if there be such), what matter? The plan has the hearty indorsement of the Honorable Secretary of the Navy; it is being vigorously pushed by the Surgeon General; and the details of execution are in the hands of Rear Admiral E. R. Stitt, Medical Corps, United States Navy, who is excelled by none in knowledge of medicine, in experience as a teacher of medicine, and in that soundness of judgment and clarity of vision essential to the success of the undertaking.

The easy process of creating a competent man to run the hospital laboratory, or care for the eye cases, or do the surgery by simply designating the most available member of the hospital staff to assume that particular portion of the work had something to recommend it, but not enough to make it justifiable. We venture to assert that a half-baked bacteriologist in charge of a hospital laboratory, and hence the person on whose verdict many a vital diagnosis must depend, is as dangerous and mischievous a potentiality as the tyro armed with a scalpel. It is hoped that the trained laboratory man will serve also in the capacity of internist, combining analogous and associated functions in the same way that the true surgeon is vastly more than a clever operator. As the true surgeon not only does good operations but possesses the diagnostic acumen to divert from the operating table many a case that will not receive ultimate and lasting benefit from the knife, so the combined internist and laboratory expert will be able to reduce enormously the number of routine laboratory tests that look well on paper by suggesting thoroughness but contribute very little to a prompt determination of the essential lesion.

It may be proper to add that it is not proposed to develop a favored few, who will be above going to sea when their turn comes or too highly specialized to discharge the ordinary duties of the medical officer of a ship. On the contrary, it is believed that a certain amount of general practice from time to time will prove a valuable corrective to the lamentable tendency of the specialist to narrow views and a contracted horizon, and will actually increase his efficiency in his particular branch by keeping him in touch with those aspects of general diseases so intimately connected etiologically with many a disorder of the special senses. Long tours of shore duty

for the specialist were a necessity when we had but two or three. They made themselves indispensable by diligence and ability, and there was no one to replace them when a change of station was contemplated or desired. They were, and are to-day, terribly overworked. A few years hence, under the successful operation of the new scheme, this situation will be materially altered and, better still, we shall be able to recruit the Medical Corps to full strength by demonstrating how infallibly the young medical officer whose first period of service proves him entitled by industry and native talent to special consideration receives direct and systematized facilities for perfecting himself in the field of his predilection.

STANDARDS OF DUTY.

I.

Mrs. Galen, lightly touching her nose with a powder puff, arranging a scarf on her head, carefully insinuating white hands into new gloves, listens with one ear for the chug of the motor at the front door while the other keeps her in touch with the progress of her husband's toilet in his room across the hall. Dr. Galen, who rarely indulges in an evening off, is always meticulous in the matter of dress and exasperatingly deliberate in starting to anything but a case. "Are you ready, Claude?" has to be said a good many times before the cheery answer rings out: "Time to be starting, dear. We'll miss the overture if you go on prinking much longer!"

They are almost at the street door when the telephone in the hall rings imperiously.

"Don't answer it. If we had been a second earlier we'd have been safely out of the house." The doctor hurries to the receiver, heedless of his wife's volley of protests.

"Yes. — This is Dr. Galen. — Yes. — Yes. — That's too bad. — Since when? — Five o'clock this morning? — Indeed! — You just caught me. — I'll be there in 20 minutes. — All right. — Put her back to bed. — Good-bye."

"You are not going to pay a call now! Is it that horrid Mrs. Aurelius again? They live miles and miles out and the road is abominable," cries the doctor's wife in a tone of blended rage, reproach, and disappointment.

"I'll take you to the show, put you in your seat, run out to the Commoduses, and be back before the end of the first act," says Galen reassuringly.

"Indeed, I'm not going."

"Now don't let's waste any time on strikes and demonstrations. The sooner I get started the sooner I'll be through."

"I might have known it! I never yet counted on having you all to myself for one evening or made plans for us to do anything together but what something was sure to interfere, and, of course, everybody and everything comes ahead of me."

Mrs. Galen now sheds a few tears and their emollient, relaxing, and antispasmodic effect enables her husband to get her into the waiting automobile and they dash off to the Villa Commodus with the understanding that Mrs. Galen will wait in the car while the doctor prescribes and they will go to the opera and sit down together "like other people."

There had been a time in the life and professional career of Dr. Galen when the necessity of answering with great promptness every call he was fortunate enough to receive dominated all other considerations in life, whether the fee was to be a dollar or five or the promise "to be round with what I owe you on Saturday night, Doctor." And as one patient leads to another and, more important still, as a disgruntled or dissatisfied one carries others with him to the old rival or enterprising newcomer, the habit of always answering the telephone and of always obeying a summons had become as ingrained in habit as the pleasant smile and expression of confirmed optimism which made people say: "If you have Dr. Galen you know as soon as he enters the room you are going to get well." There was another expression constantly on people's tongues, which was an excellent business asset for him. "Well, send for Dr. Galen. I know you can get him if he is in town." This reputation counted for as much if not more than that which some of his confrères laboriously built up and was expressed in the words: "Dr. So-and-So is all right if he'll come, but he is so frightfully busy now that I doubt if he will see you except by appointment, and he only goes to the houses of his old patients."

When the time came that Galen could afford a box at the opera it was from long custom and a farseeing eye to the permanence of patronage that he unfailingly put business ahead of everything else until the season for the sacrosanct yearly vacation. Not that Galen was a sordid money maker; he was neither that nor a martyr to duty as some of his admirers proclaimed. He simply realized that success in his calling depended in about equal measure on skillful treatment and a full recognition of the whims and vagaries of the sick. With this, too, was the consciousness of his obligations as a public servant, an element of the compelling motive representing about 5 per cent of the whole, as Galen saw himself, and a faint chemical trace as God saw him.

But Galen, whatever the cynical and pitiless analyzer of human character may say, was a man of scrupulous and unswerving integrity, and just as no one who had befriended him and helped to

give him a leg up in his fledgeling days ever lacked for sympathy or assistance from him later, fee or no fee, so were it conceivable that a service had been paid for in advance, he would have gone through fire and water to perform it.

II.

A cacophonous gong in the wardroom country warned Surgeon Marinus to accelerate the operations incident to "disguising himself as a gentleman" and to be less fastidious in selecting a tie appropriate to the mood of the moment, and presently a knock at the door and a messenger's polite accents announced that it was "ten minutes to boat time," and the next boat ashore would be at 9 p. m. It was therefore annoying and "just his luck," as he started for the deck, to collide with a hospital corpsman who informed him there was a man in the sick bay who wanted to see the doctor about his eye.

"What's the matter with his eye?"

"I don't know, sir; he says it hurts him."

"Who is it, anyhow?"

"I don't know his name, sir. He is an old boatswain's mate. He never was at the sick bay before since I've been on the ship."

"Why didn't you go for Dr. Minimus?"

"He's not aboard, sir. I've looked every place for him."

As he took his hurried way along the berth deck Marinus reflected with bitterness on the ways of the genus Minimus, all-wise and all-knowing but as difficult to locate as the anatomical seat of the soul. In two minutes Marinus brought out the fact that the boatswain was the victim of presbyopia and had been a year deciding to interview the doctor about the mystery of being able to read a book more easily the further he held it from his eyes. So an appointment was made for an extended examination at 2 p. m. next day and Marinus rushed to the gangway only to find that as the junior officers had gone ashore early in the afternoon the boat had been shoved off promptly on the stroke of the bell. But the captain appeared at this juncture and kindly offered the surgeon passage in his own launch; so all was well.

Marinus acted with perfect propriety in remanding the eye case to the morrow. Morning and evening sick call have their designated place on the calendar of the military day and only unusual or emergency cases are supposed to present themselves at other than the specified hours. This is essential for the orderly and full accomplishment of the ship's routine. Otherwise the division officers would be constantly missing men who had gone to the sick bay with real, fancied, or pretended ailments or who were merely in hiding elsewhere to escape formations and drills. As for the doctors they would have little time for inspections, vaccinations, the laboratory work incident to diagnosis, instruction of the hospital corps, special

treatments and examinations, the supervision of the nursing, feeding, and treatment of the sick, and the general upkeep of the medical department if each member of a crew of 800 to 1,000 men could choose the time most agreeable to himself in which to consult the doctor.

III.

Probus was young and inexperienced but honest to the core and resolved to live and practice his profession by the loftiest standards. One of his first decisions was that he would never pay an unnecessary professional call, since he proposed to charge and try to collect for every visit he made. Regularly once a week he went to see James English, a chronic invalid. The boy's father and mother frequently asked him to come oftener, but Probus always had a good excuse and stuck to the weekly visit until English Senior came to the office and they had it out together.

"There is nothing alarming or dangerous in Jim's condition. I see him often enough to attend to his needs and I do not propose to collect fees I have not earned." Thus Probus.

"I respect your probity but I shall have to get a doctor with a broader conception of his functions," retorted English firmly. "You see if Jim gets to worrying about himself we want him reassured. If Jim's mother grows excited over her son's condition it is worth a few dollars to me to have you come and set her anxieties at rest and so restore my peace of mind. I should like to have in attendance a man upon whose word I can rely as I do on yours, but at least I must have one who will come when he is sent for, whether its a false alarm or a desire for a little comfort. There's a vast amount of distress in this world with very little justification in fact, but if the doctor can dissipate it that is as much a part of his functions as to mend a broken head or write a death certificate."

Twenty years have slipped by since this conversation and Probus is still the family physician of the Englishes. He is not rich and never will be, but he knows that one can earn a fee without the display of stethoscope or prescription pad.

IV.

As a class the medical officers of the Navy of the United States of America are industrious and upright, but they are human beings and therefore liable to errors of judgment and conduct. Each of us needs to be constantly reminded of our weaknesses and besetting sins and to be cautioned against those failings to which we are peculiarly liable. It may be despicable for the civilian to coddle a trivial case and lavish attentions upon patients who would

probably get well without him for the sake of earning a bigger fee and enhancing his own reputation, but the official doctor is apt to be a little too curt in his handling of minor ailments and in him it is a virtue to pay the call not strictly required of him by regulations and to cultivate the sympathetic manner just because he can usually draw his salary whether his patients like him or not.

With increased rank and desirable assignments there comes sometimes the subtle temptation to feel that this or that duty is beneath one's dignity and that the time has passed for running one's legs off at the beck and call of any and everybody. Though it is true that many illegitimate and frivolous demands are made of the Navy doctor how much better to do what is asked with a good grace than to stand too strictly on prerogative. Too often there will be no opportunity to explain the doctor's side of the matter and his legally defensible attitude becomes a lasting reproach to the whole corps. Better to make a thousand useless trips than to miss a single one of vital import.

The Biblical injunction to answer a fool according to his folly may be translated to read in medical language: "In relation to sickness people are like children and must have allowances made for them and be humored accordingly." (Who can be so childish and unreasonable as a sick doctor?)

There are no set days for sickness and accident. The patient or the anxious relatives who wait in vain for treatment or the assurance that there is no cause for alarm will never be satisfied with the explanation that it was not Doctor So and So's day on duty, though So and So clearly has a right occasionally to a little time to himself.

We do not judge other people, but we know ourselves, and who dares assert of himself that he has not a lazy bone in his body? We owe it to our high calling to be willing to go early and late; to the bedside of the ordinary seaman's child as to that of the admiral's wife. We owe a duty to each and every member of the big Navy family, but we owe most to ourselves, not in the way of ease and comfort, but in conforming each to an individual standard of honor and obligation higher by far than we could impose on another.

IN MEMORIAM.

EDWARD GRAHAME PARKER.
1870-1919.

By C. E. BIGGS, Captain, Medical Corps, United States Navy.

When an officer has been in the service for as much as 20 years his personal character becomes pretty generally known to the service at least on account of the great number of fellow officers who happen to have served with him. He has built up for himself something known as service reputation, which is a composite of his various activities while in the service. His character is an integral part of that great influence which we understand by service life. If death claims him, the loss is felt by the entire service and not by a particular part of it only. On such an occasion his service career comes before us for an estimation of our loss and affliction.

The service does not often give an officer the sort of duty that would afford him an opportunity to manifest his highest personal qualities. But in this respect Dr. Parker was singularly fortunate, as on three or four occasions he had duty which enabled him to provide range to his kindness, energy, and unusual professional attainments. One such instance was his duty at the Naval Academy where he was in attendance upon sick officers and their families. In his work was like that of the family physician of civilian life, requiring the highest degree of kind, patient, cheerful attention to the interests of others. His special aptitude for this duty soon became known. In fact, the splendid character and great amount of work which he accomplished at the Naval Academy are still commended upon with unstinted praise throughout the service. His kindness was universal and did not permit him to fail to respond to those who needed his help, or thought they needed it. The hour was never too late nor the distance too far. No doubt he answered many calls that were unnecessarily made, but his kindness was bigger and broader than mere matter of duty.

Another place where Dr. Parker had duty for which he was specially fitted was the naval station, Samoa. He had two tours of service at this out-of-the-way place. His first was for a period of one year, during 1904 and 1905. The second tour consisted of two years, from 1914 to 1916. As the strictly naval duties at Samoa were light, Dr.

Parker found considerable time to practice medicine among the native inhabitants. Not only the manners and customs of these primitive people interested him but their sufferings from disease appealed strongly to his sympathetic nature. Chaplain Frazier has informed me that the doctor and he often made trips over the island to visit the different villages for the purpose of administering comforts to the sick. The trips were made on foot, following the trails from village to village, and sometimes a distance of 25 miles would be covered in one day. Their equipment consisted of a jug of castor oil, a large spoon, and surgical dressings with which to treat the numerous tropical ulcers. Their coming would be heralded in advance by some of the natives, and, upon arrival, they always found a considerable number of Samoans awaiting their helpful services. Dr. Parker's merciful activities among the natives caused him to be universally loved by them. It is seldom that a naval officer has had the opportunity to go so far afield in his kindness to others as to acquire the love of a large number of persons of a savage race. But when our kindnesses and acts of mercy have all been done, whose judgment will say that the love and affectionate admiration which these acts have caused to spring from the hearts of a primitive people are any the less worthy?

To the sick Dr. Parker was faithful and loyal in the broadest sense. Fidelity was a factor in his character which was soon noted by those who happened to be thrown with him. His solicitude for his patients was constant, and their interests were never absent from his thoughts. For instance, an officer who was on duty with him at the New York Naval Hospital told me that Dr. Parker always visited his wards, no matter how late it might be when he returned to the hospital. He was never too tired and the hour was never too late for him to go to his wards to inquire if everything were all right, and to see if there were anything he could do for the comfort of his sick.

As I recall Dr. Parker, fidelity, kindness, modesty, cheerfulness, and a broad tolerance for the mistakes and weaknesses of others were dominant traits of his character. I share with a great many others in the Navy the great satisfaction of having served with him. I knew him well; with his stricken family, with his former shipmates, and with the thousands who knew and loved him in the various parts of the world where he had served, I mourn his untimely death.

SUGGESTED DEVICES.

SCUTTLE BUTTS ON BOARD SHIP.

By J. A. B. SINCLAIR, Lieutenant Commander, Medical Corps, United States Naval Reserve Force.

In the months of March, April, and May, 1919, on board the U. S. *Von Steuben*, there occurred 85 cases of typical acute follicular tonsillitis among the crew of approximately 1,000. As the case of infection on the ship, up to June 24, occurred on May 24,



FIG. 1.

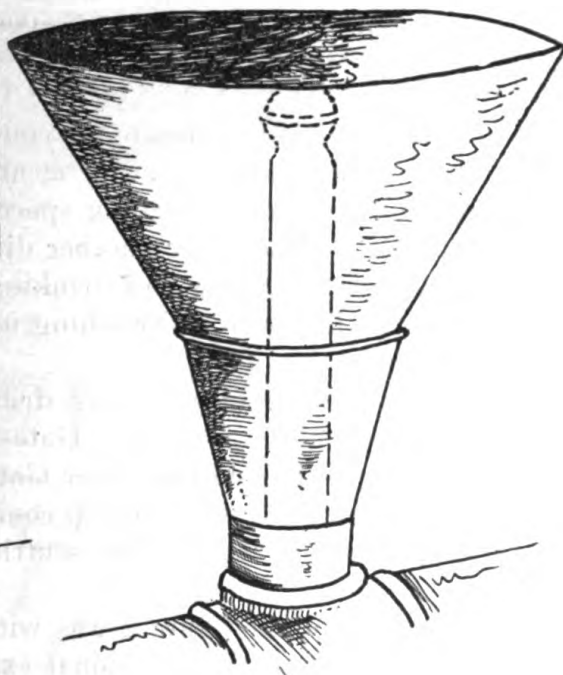


FIG. 2.

Just two days after the substitution of portable light protectors (fig. 1) for the solid metal guards or shields (fig. 2) on our four Gates scuttle butts; and as there are 85 days from March 1 to May 24, inclusive, the incidence was one case of tonsillitis per day—and the cases occurred in very nearly that order—showing a steadily continuous and uniformly operating source of infection, with results as follows.

Month ending Mar. 31, 1919:	
Patients with acute follicular tonsillitis.....	33
Patients with all other diseases.....	45
Sick days from acute follicular tonsillitis.....	143
Sick days from all other diseases.....	150
Month ending Apr. 30, 1919:	
Patients with acute follicular tonsillitis.....	25
Patients with all other diseases.....	73
Sick days from acute follicular tonsillitis.....	89
Sick days from all other diseases.....	180
Month ending May 31, 1919:	
Patients with acute follicular tonsillitis.....	27
Patients with all other diseases.....	30
Sick days from acute follicular tonsillitis.....	133
Sick days from all other diseases.....	80
For March, April, and May, 1919:	
Total patients with acute follicular tonsillitis.....	85
Total patients with all other diseases.....	157
Total sick days from acute follicular tonsillitis.....	385
Total sick days from all other diseases.....	419
Excess of all other patients over tonsillitis patients.....	72
Excess of sick days of all other patients over tonsillitis patients.....	34

Efforts were made to locate the contaminating source, as follows:

(1) A "war map" showed a uniform sprinkling of red pins throughout the crew's sleeping spaces, no division showing any decided preponderance over another division.

(2) All crew's eating and drinking utensils went through boiling water in the Lakeslee dishwashing machine, apparently exonerating the mess gear.

(3) The crew obtained their drinking water during the period under investigation from two Gates scuttle butts, principally, and to a lesser extent from two other Gates scuttle butts (eastbound trip only), the latter located in troop compartments.

Examination of these four scuttle butts revealed the following facts:

(a) The spout of figure 2 was within easy reach of the drinker's mouth, and it was the occasional exception only when he failed to reach it.

(b) The water not swallowed fell back upon the concave surface of the solid metal shield, and splashed centripetally upon the dome and stem of the spout.

(c) Figure 3 shows *a* cut off; *b* drainpipe; and *c* open end of drainpipe. The port-side end of this 1-inch drainpipe is blind, so that with the roll of the ship to port, at, and just after, the manipulation of the cut off by the consumer, and when the standard mouth guard was used, the drainage water would well up around the nozzles (fig. 2) and actually flood over the domes. In connection with, and in addition to this fault, on unscrewing the nozzle, the portion

of the stem that passes through the drainpipe, and the inside of the drainpipe, were found to be thickly coated with a tenacious green slime, presumably a fair culture medium, and on loosening the

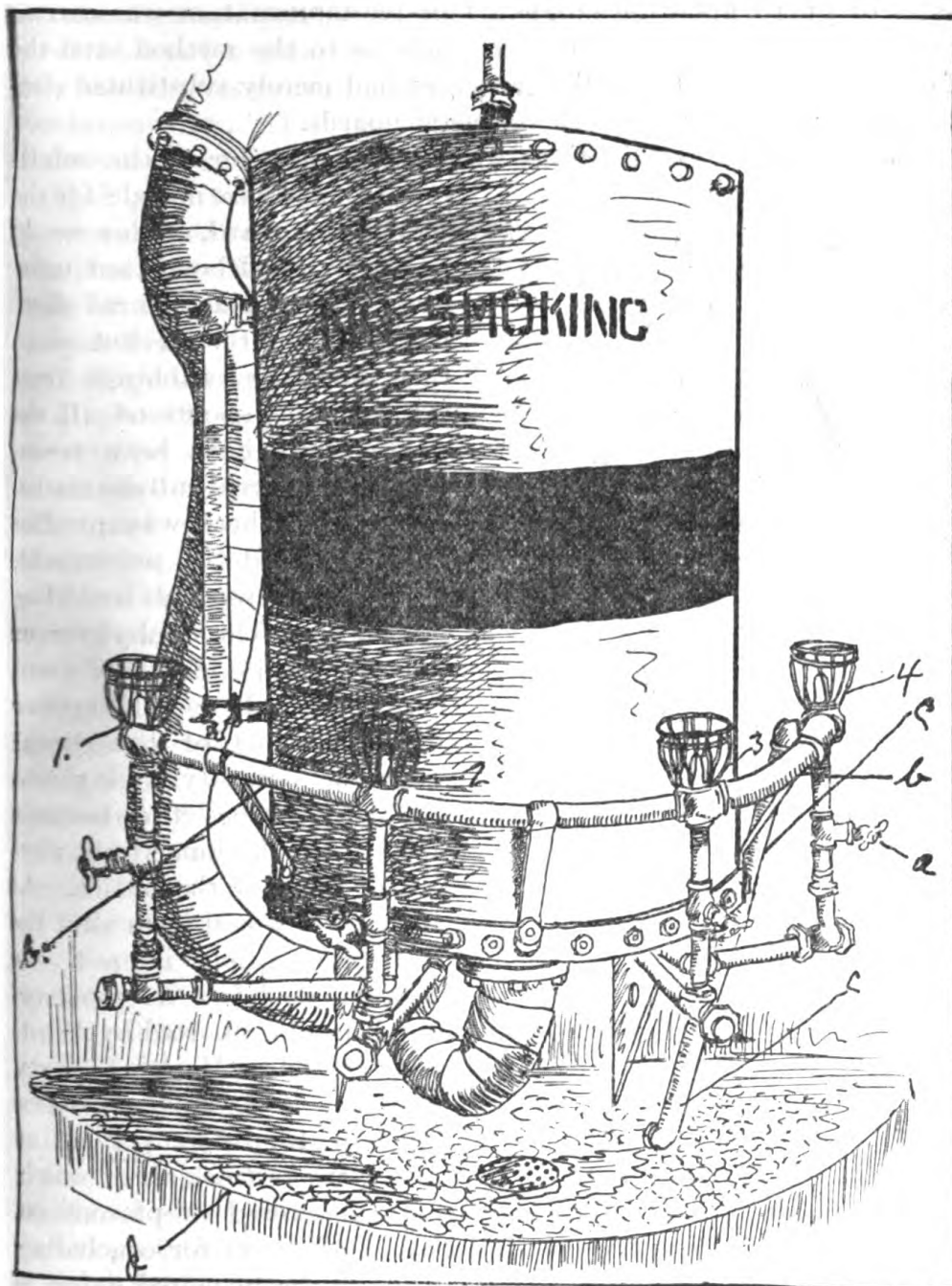


FIG. 3.

nozzle to any degree water from the drainpipe was admitted to the feed or supply pipe.

Upon ascertaining the facts enumerated above, recommendation was made that the mouth guards be removed and a cage or muzzle guard be substituted, to be of such width (4 inches) and height

(6½ inches) as to prevent contact of the consumer's lips. Of course the spaces between the wires of the muzzle guards (fig. 1) prevented the flooding of the nozzle and the splash back from the sides of guard upon the nozzle. This recommendation was carried out so speedily, that inquiry was made as to the method, and the fact was ascertained that the carpenter had merely substituted electric-light protectors for the solid metal guards.

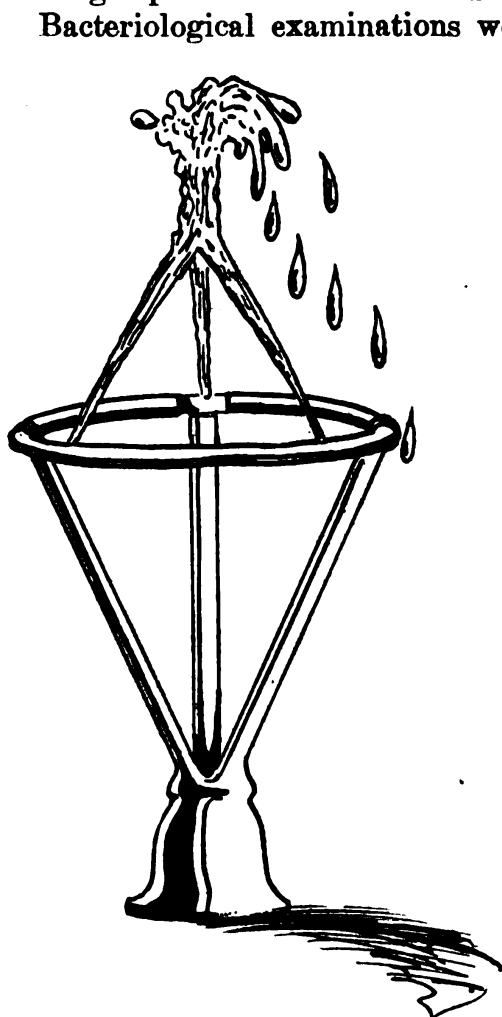


FIG. 4.

Bacteriological examinations were not made prior to the substitution of the wire muzzle for the solid metal guard, as this would have been like delaying antitoxin therapeutics for a cultural diagnosis of diphtheria, but since then numerous swabbings from the domes of spouts of all the scuttle butts have been transferred to different culture media, and always there was profuse growth of bacteria, presumably mouth flora, usually including streptococci. The staphylococcus aureus was identified from two spouts. It would appear that the spurt of the stream (now of necessity rising into the air) washes the bacteria away from the immediate margin or edge of the outlet. At any rate it would seem that the vertical position is not the "principal defect in construction," as was reported by Whitaker in Public Health Reports, May 11, 1917, upon 77 fountains of 15 different types at

the University of Minnesota, all of which were vertical, all of which had other defects, and 80 per cent of which showed streptococci on culturing smears from the mouthpieces. The reason for concluding that the vertical position of the spout is not the principal defect is that our epidemic of acute follicular tonsillitis was cut short by the elimination of the other defects enumerated, while the vertical position of spout and stream was continued. (Fig. 1 and fig. 3.)

Various types of fount have been suggested and designed, the principle of which is to eliminate the possibility of the partly used and

therefore contaminated water falling back on the supply spout. Two of these are here detailed and a third suggested:

(1) Figure 4 is sketched from memory of a type tried out on the *U.S. Zeelandia*, and discarded for the reason that the expenditure of water was too great for ships, and that without a pressure regulator the streams converging to form one failed to meet when pressure became low. This is an excellent type for cities, and is employed in the schools of Norfolk, Va., but is hardly adaptable to ships.

(2) Figure 5 was designed by Whittaker to substitute the faulty one examined by him, but we believe that it would be subject to the same waste as the type represented by figure 4, because of the 45° angle of the stream and the necessary falling short when pressure becomes low.

(3) Figure 6 was next suggested as a possible type that might be to be economical both from the standpoints of expenditure of water and of construction, and from a sanitary point of view, and from this suggestion the horizontal nozzle and guard of figure 7 were actually devised.

Figure 8 and figure 9 may be taken to represent all four of our nozzles as they are now in operation. The material is brass, on account of the probable corrosion of verdigris, as suggested by Captain Horne, the guards are tinned, giving a more inviting tone. While the coating of tin is not quite so bright or as durable as nickel plate, it is easier to accomplish on board ship and would be good for about six months, when the nozzles may be unretinned and retinned.

In figure 7 note that the support ribs *b* for the mouth ring are of the same piece with the 1-inch brass pipe and are simply the distal slitted and flared end of the pipe. It will be noted also that the horizontal direction of the nozzle or spout not only prevents the falling back of water on the nozzle itself, but prevents likewise any partly used and therefore contaminated water from entering the drainpipe and hence into the feed pipe by reason of faulty connection, thus eliminating the feature which, after that of direct contact of the mouth with the spout, is perhaps the "principal defect of construction" of any drinking fountain and is likewise the second greatest menace as

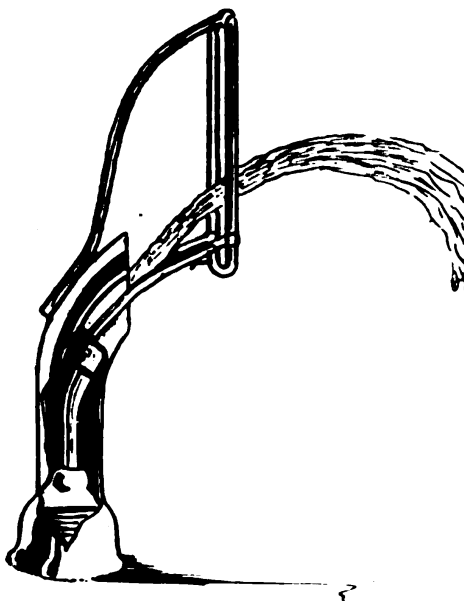


FIG. 5.

a source of transmission of disease associated with it. The drain-pipe is put out of commission.

For battleships, where the saving of water is of more importance than on transports, the objection may be made that the drain line (fig. 3) would not return the waste water to the feed-water bottoms. The answer is twofold (*a*) that the waste water can be saved by fitting an appropriate strainer to deck drain, and running drain line to feed-water bottoms, and still permit the use of fresh water for making up feed water, and (*b*) the saving of 385 noneffective days in three months would be a fair offset for the additional expenditure of fresh water, even if it were not saved.

Occasion is taken to thank Captain F. J. Horne and Lieutenant Commander W. T. Mallison, the executive officer, for their ready and hearty support of the various suggestions and

recommendations in connection with the work, and to thank and commend our carpenter, Mr. James Sanders, for his speedy and clever execution, and for his well-nigh exact reproduction of the designs.

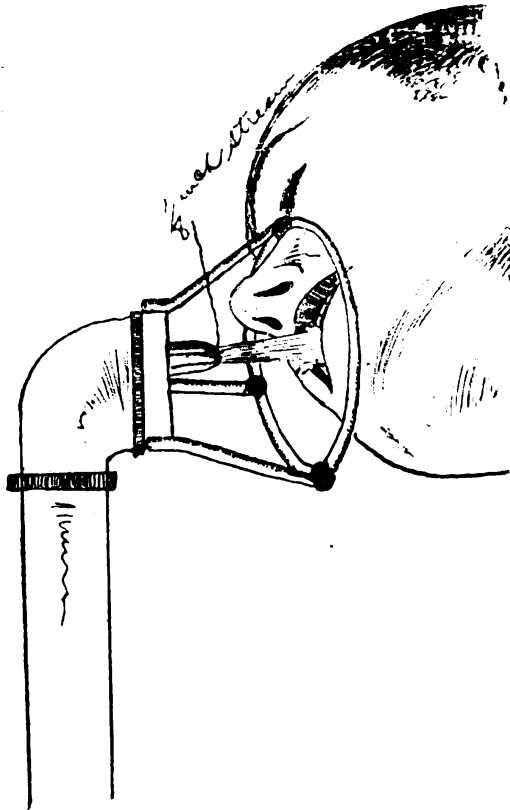
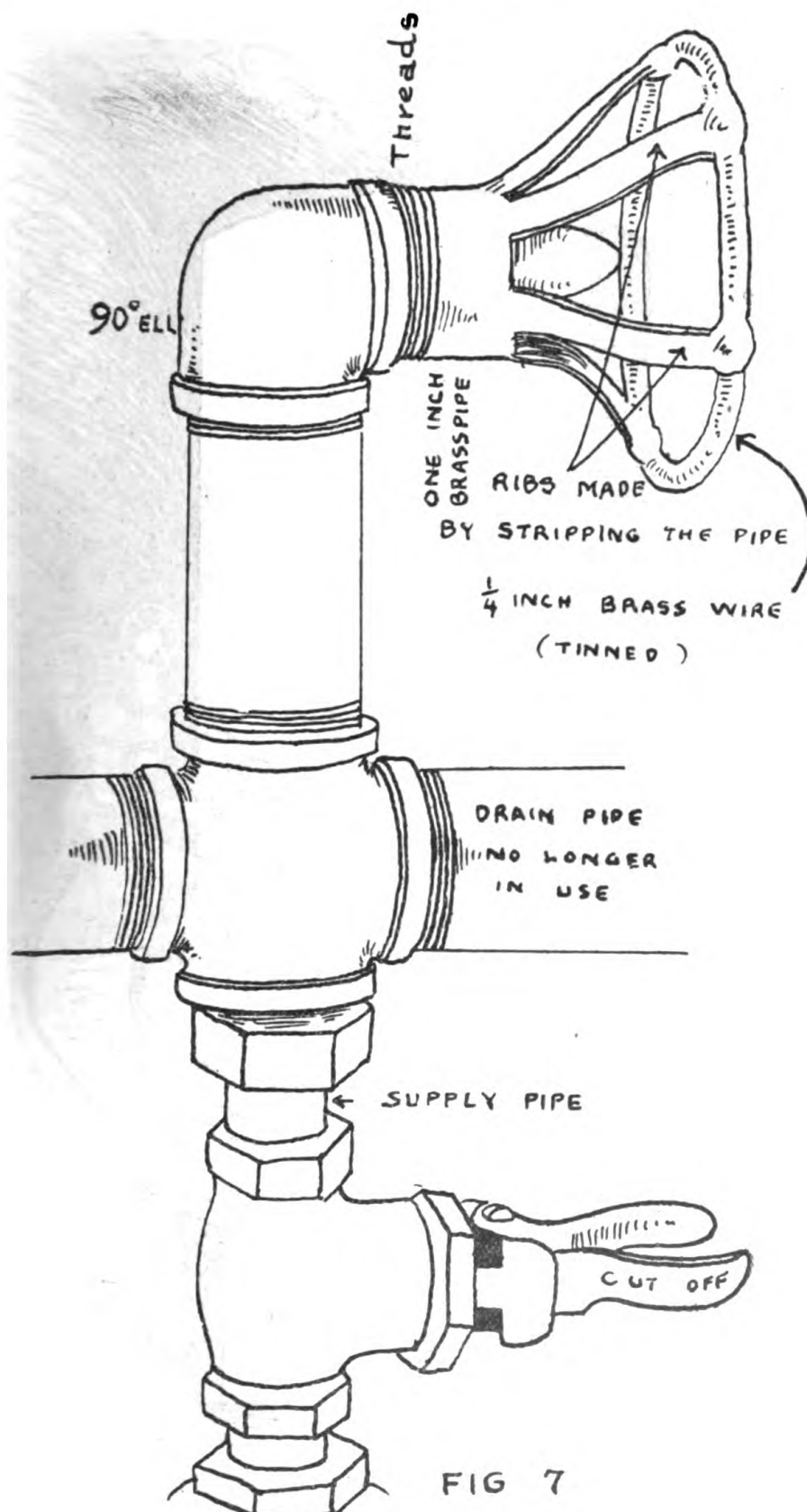
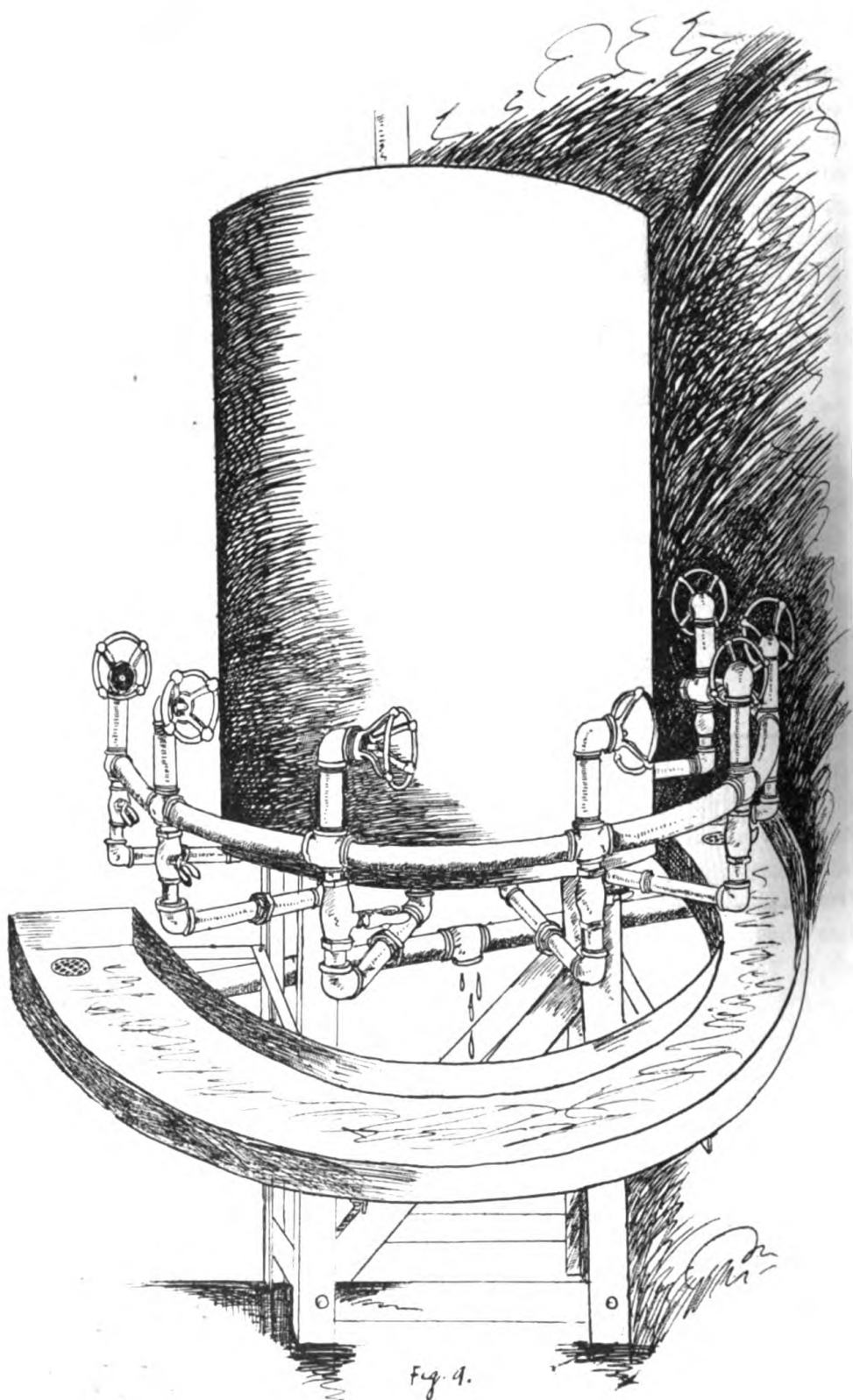
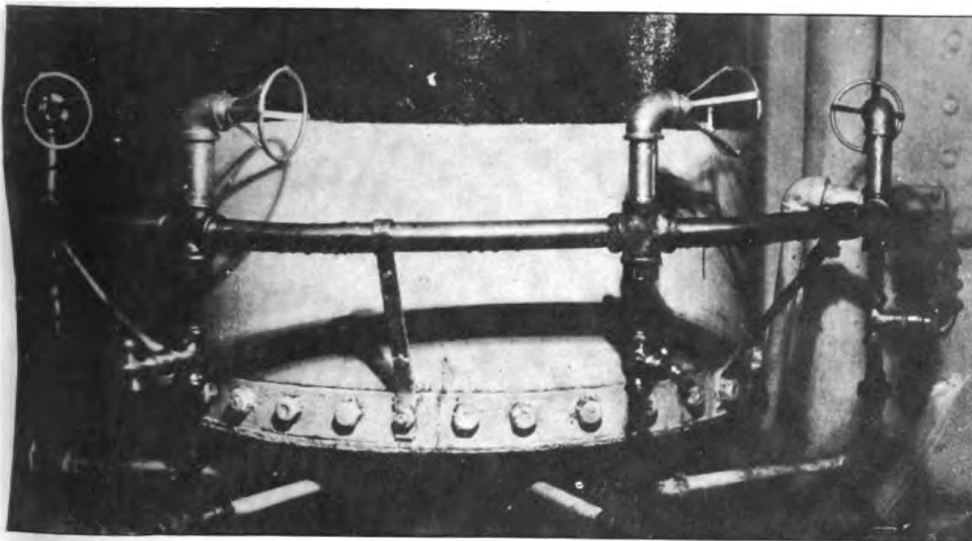


FIG. 6.







144-1

Fig. 8.

AN EMERGENCY EVACUATION DEVICE.

M. le Médecin Principal Pervès of the *Jean Bart*, has suggested a simple and practical method of transporting and evacuating the wounded on board ship based on an apparatus used by the fire department of Paris. The accompanying illustrations are reproduced

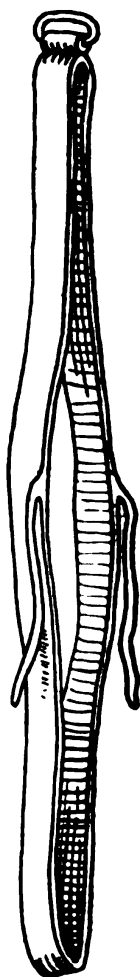


Fig. 1.



Fig. 2.



Fig. 3.

by authority of the French Minister of Marine from *Archives de Médecine et Pharmacie Navales*, Vol. CVII, No. 5, May, 1919.

The intention of the present note is to show how in emergencies, when rescue must be accomplished with a minimum of delay, the body of an unconscious person may be transported and hoisted with ease by a device which can be readily improvised if there is canvas, rope, a stout sheet, or blanket at hand.

In other words we are not reporting Dr. Pervès's apparatus but his idea. Any stout material which can be made into a circular band $2\frac{1}{2}$ meters long by 7 centimeters wide by sewing or more quickly by knotting will answer the purpose. This is laid under the patient,



Fig. 4.

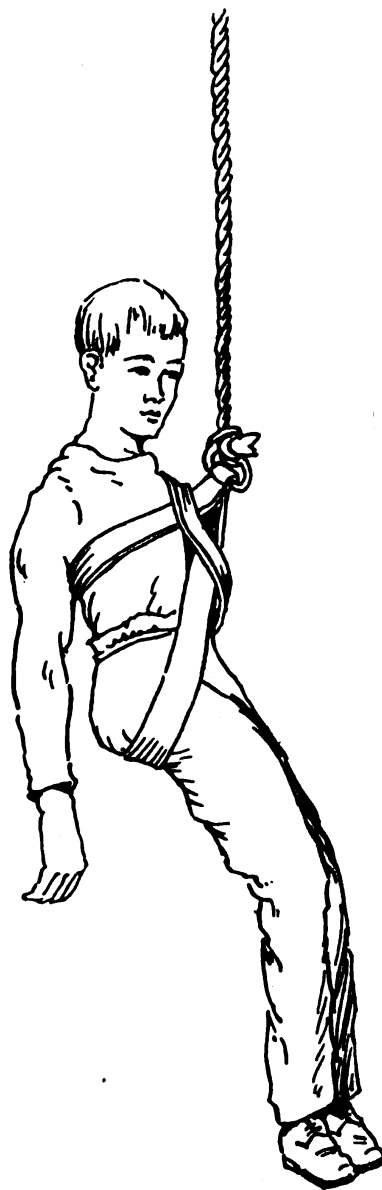


Fig. 5.

a portion of it passing under the shoulder blades and a portion below the buttocks. The free portion is drawn forward as a loop on each side. (Fig. 2.) The bearer lies flat on his face beside the patient. An assistant rolls the latter over on the back of the bearer, who now slips an arm through each loop and is helped to his feet. If the

patient can be stood erect for a moment the loading is easier and quicker.

In ascending a ladder, as in coming over the side, up the shaft of a well, etc., some of the patient's weight can be taken off the bearer and the latter's progress made steadier and easier by securing a line to the circular band as shown in figure 4.

Figure 1 shows the device as used on the *Jean Bart*, made of mole-skin, having a metal ring to hoist by and lashings to go over the bearer's chest.

Figure 5 shows the circular band used for hoisting a man who is conscious, by simply passing one lateral loop through the other.

Useful as the Stokes stretcher is in any and every emergency on board ship, it is undeniable that some time is required to secure a patient in it when he is to be hoisted vertically. There may be situations when every second is of vital importance. The naval surgeon will therefore do well to remember that enough rope to leave $2\frac{1}{2}$ yards clear after the ends are knotted will answer every purpose contemplated by the Pervès device.

CLINICAL NOTES.

BRONCHOPULMONARY SPIROCHETOSIS IN AN AMERICAN.

By G. W. Lewis, Lieutenant, Medical Corps, United States Navy.

Among the contagious diseases spread by the war must be placed bronchopulmonary spirochetosis. This is a peculiar form of bronchitis characterized by the presence of enormous numbers of spirochetes in the expectoration and usually accompanied by cough, bloody sputum, loss of weight, and sometimes fever. It was first described in India by Castellani in 1906, who called the various forms of spirochetes found in his cases *Spiroschaudinnia bronchialis*. Since then the disease has been encountered in Ceylon, India, the Philippines, and the West Indies. Recently it has been frequently encountered in France by Violle¹ and Barbary.² It has also been observed in Peru by Corvetto³ and Ribeyro.⁴ These observers suppose it to have been imported by Asiatic troops or immigrants. They have recognized its contagiousness, and Barbary treated it with arsphenamine.

The following case is reported not only to call attention to an infection of our troops abroad that may be confused with tuberculosis, but also because it involves the question of whether or not bronchopulmonary spirochetosis has reached the United States.

The report: J. S., private, Seventh Regiment, United States Marine Corps, on detached duty, Camaguey, Cuba, presented himself on sick call, August 4, 1919, for relief of hemoptysis. His health record showed that he had been admitted to the sick list with a diagnosis of hemoptysis almost a year previous, the patient being at that time on duty in the United States. A short time after he was discharged to duty, relieved. Inquiry into the past history brought out the possibility of his present condition being a continuation of his former illness. The patient stated that since his first admission the blood spitting had not entirely disappeared, although at times it was so slight that it could hardly be noticed. He also said that recently he had been spitting more blood than usual and thought he had lost some weight. According to the patient's statement he was slightly gassed and wounded while serving with the Canadian

¹Violle, H.: Bull. de l'Académie de Méd., 1918, 79, 22, p. 429.

²Barbary, F.: Bull. de l'Académie de Méd., 1918, 79, 25, p. 461, also *ibid.* 80, 37, p. 243.

³Corvetto, A.: Anales de la Facultad de Medicina, 1918, 2, 5, p. 141.

⁴Ribeyro, R. E.: Cronica Medica, Lima, 1918, 35, 665, p. 351.

forces during the early part of the war. On his right shoulder were scars and discolorations which might have been produced by mustard-gas burns, while the left arm and forehead showed scars which possibly were due to wounds received in battle. Whether there is any connection between the gas injury and the present illness can not be ascertained. The patient did not think it dated back that far, for about six months elapsed before his enlistment in the Marine Corps, and during that time he had not experienced any pulmonary trouble at all.

The subjective symptoms were moderate productive cough, spitting of blood, weakness and loss of weight. Physical examination elicited the usual signs of catarrhal bronchitis. Temperature and respirations were normal. The material expectorated was of large quantity, very foul, frothless, dark red, and in the bottle had the appearance and consistency of red ink. Microscopic examination showed the presence of many red cells and polymorphonuclear leucocytes. Five specimens were negative for tubercle bacilli. A smear stained with alcoholic solution of methylene blue swarmed with spirilla of various lengths and shapes. They were so numerous that it was impossible to count the number in a field. Some of the organisms were very short and had only one or two twists; others were much longer with the same number of twists; while still others had as many as ten twists. The ends were pointed. Repeated examinations showed the same picture.

The patient was put to bed and placed on liquid diet, and late in the evening was given a saline purge. On the morning of August 5, 0.6 gm. of salvarsan was administered intravenously. The reaction was quite marked. The next day he was given 10 grains of quinine sulphate and 10 drops of Fowler's solution by mouth, twice daily. These were continued till the day of discharge. Three days after the injection of salvarsan some improvement was noted. This consisted in an amelioration of the cough and a decreased amount of expectorated fluid which was blood-tinged and of a somewhat viscid nature. By August 16 all the symptoms had disappeared and repeated examinations of the sputum failed to show the presence of spirocheta bronchialis. The patient was discharged as cured 11 days after the institution of treatment.

This is an example of the rapid termination of these cases when treated with arsenical preparations. These drugs seem to possess a specific action in the destruction of the spirocheta bronchialis.

A PROBABLE CASE OF ENCEPHALITIS LETHARGICA.

By A. F. KUHLMAN, Lieutenant, Medical Corps, United States Navy.

There have been reported from various European countries, and more recently from different sections of the United States, notably New York, South Carolina, and Illinois, instances of a disease to which the name epidemic lethargic encephalitis has been applied.

The characteristics of this disease as commonly described are as follows: Slow or acute onset; somnolence, coma, delirium, catalepsy, muscular asthenia, paralysis of cranial nerves, masklike face, choreiform movements; duration indefinite; fatalities common. Post-mortem examinations have revealed punctiform hemorrhages and cellular infiltrations around the vessels of the third, fourth, and lateral ventricles, the pons, peduncles, and spinal cord. Important diagnostic features are said to be the masklike expression, lack of spontaneous movements, and negative spinal fluid, the latter being particularly important in differentiating from poliomyelitis, tubercular and spinal meningitis.

A report is being made of the following case for the reason that a definite diagnosis has not been arrived at and because of the possibility of its being encephalitis lethargica:

E. W. P., age 20, was admitted from the U. S. S. *Goliath* to Navy Base Hospital No. 5, Brest, France, on August 28, 1919, with the following history: Onset sudden two days ago with vertigo, headache, lassitude, weakness, mild delirium; temperature 100°, pulse 80, respiration 20. Upon admission the following symptoms and physical signs were present: Vertigo, severe headache, stupor. The patient lay very quietly with closed eyes, making no voluntary movements.

Questions were only answered after repeated request, and then the speech was slow and indistinct and the sentences incomplete. There were general muscular flaccidity, loss of the superficial and deep reflexes, automatic movements of the right arm, purposive in character, as scratching the side of the chest; paresis of the right side of the face but no ocular paralysis. Pupils were dilated but active and equal. There was no vomiting nor diarrhea, no gingival lead line, no splenic enlargement, no eruption. The respiration was regular, of normal depth, and 22 in frequency. The pulse was regular, 88 in frequency, and blood pressure 118, systolic.

Three hundred cubic centimeters of urine were passed voluntarily. This showed only a trace of albumin and no casts, but a marked reduction of Fehling's solution and large quantity of diacetic acid and acetone. The 24-hour output lay between 1,000 and 2,000 cubic centimeters, and a phthalein test revealed an output of 70 per cent. A lumbar puncture revealed a clear fluid with normal cell count and

a negative globulin, but under markedly increased pressure, flowing out in a continuous stream. Blood Wassermann negative; cultures of blood, urine, and stools negative. Blood count 4,500, pulse 68; no malarial organisms and no stippling of red cells. Diagnosis of diabetic coma made and appropriate treatment instituted.

4th Day: Condition remained practically the same, with exception of a more lucid mental state. Temperature still 103°, varying but slightly. Nosebleed. Sugar has disappeared from the urine.

8th Day: Mental condition much improved, but still somewhat stuporous. General condition somewhat better. Temperature 102°. Daily nosebleed since 4th day. Sugar has not reappeared. Carbohydrate intake 50 grams.

12th Day: Mental condition greatly improved. General condition very good. Temperature, 102°. Paresis of face has disappeared. Nosebleed has ceased. Carbohydrate intake 100 grams. Sugar has not reappeared.

14th Day: Sugar tolerance tested by method of Naunyn (100 grams glucose at one sitting superimposed upon an amylaceous meal). Not the slightest trace of sugar appeared in the urine.

15th day: Temperature, 99°. Reflexes have not yet returned. Patient reading a novel. The temperature ranged between 102° and 103° until the 13th day when it became lower, reaching 99° on the 15th day with the patient convalescing.

Upon admission to the hospital the following diagnoses were considered: (1) Diabetic coma, (2) poliomyelitis, (3) cerebro-spinal fever, (4) tubercular meningitis, (5) cerebral syphilis, (6) acute saturnine encephalopathy and other forms of poisoning, (7) coma of malaria, typhoid, typhus, and other acute infectious diseases, (8) uremia.

Poliomyelitis, cerebro-spinal fever, and tubercular meningitis were ruled out with certainty by the negative spinal fluid findings; cerebral syphilis by negative findings both in the blood and spinal fluid; acute saturnine encephalopathy by the absence of previous history, of anemia, gingival lead line and stippling of the red cells; other forms of poisoning by the clinical course; malaria, typhoid, etc., by the negative laboratory findings and clinical picture; uremia by the negative urinary findings, normal phthalein output, and clinical picture; hemorrhage into the pons by the absence of predisposing factors and clinical findings.

In the face of these considerations and the presence of a not inconsiderable quantity of sugar in the urine, a tentative diagnosis of diabetic coma had to be made. As the case progressed, however, this diagnosis became increasingly more untenable. The sugar disappeared within 48 hours after admission and never re-

appeared in spite of a high carbohydrate intake. Kussmaul breathing so characteristic of acid intoxication was never present.

The diagnosis of diabetic coma was therefore discarded. It appeared to the attending surgeons that the clinical picture was rather that of an acute infectious disease, but indeed was peculiar and corresponded to nothing which they had ever seen before.

The characteristics pointed to an acute infectious disease with pre-eminently cerebral manifestations. Other causes were carefully and systematically ruled out. In the light of the recorded autopsy findings, a basis of explanation for hitherto unexplained phenomena in the present case, viz, the transitory glycosuria and the markedly raised pressure of the spinal fluid, the whole aspect of the case impressed one with a similarity to the description of lethargic encephalitis. A definite diagnosis is, of course, impossible, but a report of the case was considered warranted, if for no other reason than to call attention to the existence of this apparently ill-defined disease. It is regrettable that a more thorough study of the present case could not be made, but the hospital¹ was being demobilized at the time of admission and facilities for extensive investigation were not at hand.

A DEFENSE OF THE OPEN-AIR TREATMENT OF PNEUMONIA.

By D. FERGUSON, JR., LIEUTENANT, MEDICAL CORPS, UNITED STATES NAVY.

In an article on the treatment of pneumonia appearing in a recent medical journal² the writer compares the results obtained in the open-air treatment with those of the closed-ward treatment, concluding with the general statement that the former is an unwise form of treatment.

Apparently the technique was somewhat at fault in applying the open-air treatment to judge from the following quotation from the article referred to:

Any clinician who has walked through long wards of soldiers desperately ill with pneumonia, every man lying with his head and chest next to an open window through which, on cold days and nights cold and often damp winds are blowing; who has seen these men with pinched, blue faces and cold hands and feet and has heard them again and again request that the doors and windows be closed to keep them from feeling chilly can not help but be convinced that this form of management for patients with an acute disease like pneumonia is unwise.

It is desirable to correct any impression which may exist that the "pinched, blue faces," etc., are necessary manifestations of the open-air plan of treatment and to emphasize the necessity for selecting the

¹ U. S. Navy Base Hospital No. 5, Brest, France.

² Head, G. D : Treatment of Pneumonia, Jour. Am. Med. Assn., 72 : 1268, May 3, 1919.

different types of pneumonia for the different methods of management.

Broncho-pneumonia,¹ especially in the presence of bronchial irritation, the asthenic pneumonias and pneumonias in cardiovascular shock, are generally regarded as unsuitable for the open-air form of treatment.

The conclusion that the pneumonia complicating influenza should be handled by the closed-ward plan of treatment is consistent with our views, as this pneumonia may be designated as broncho-pneumonia, pathologically.²

In the open-air plan of treatment the patient should be clad in flannel pajamas, woolen socks, coat-sweater, and helmet; the bed should be on a roof or porch out of drafts, the bed clothing arranged to prevent chilling from below, and the whole adjacent to a warm room into which the bed may be wheeled for examinations, hydrotherapy, and other purposes requiring exposure.

When evidences of chilling appear it is essential to move the patient to a warm room, as a circulatory crisis may be impending and the blood-depleted skin and extremities predispose to visceral congestion and edema. It may be that some of the symptoms referred to by the author quoted could with propriety have been ascribed to defective oxygenation of the blood in the cases observed.

¹ Hare, *Practice of Medicine*, 1915, p. 394.

² LeCount, E. R., *Pathological Anatomy of Influenzal Pneumonia*, *Jour. Am. Med. Assn.*, 72: 650, Mar. 1, 1919.

NOTES AND COMMENTS.

Extinguishing by carbon tetrachloride.—The Bureau of Construction and Repair, Navy Department, Washington, D. C., has issued the following statement regarding the danger attaching to the use, in confined spaces, of certain fire extinguishers:

On January 10, 1919, a fire occurred on the submarine *S-4*, at the Portsmouth yard, which resulted in the death of two men. The facts established in the case are as follows: Two men went into compartment C-2, lubricating oil tank, located between the 95 and 100, to do a job of electric welding. The part to be welded was overhead and drops of molten metal fell and set fire to welder's clothing. The helper turned a stream from the Pyrene fire extinguisher upon him and the compartment immediately became filled with suffocating fumes which quickly rendered the helper unconscious. He fell in such a position as to block the exit for the welder and both men were exposed to the fumes for a period of about half hour when a hole was cut in the top of the tank and the compartment ventilated. The men were removed in an unconscious condition about one-half hour later through a hole cut in the bottom of the tank. At the hospital both men appeared to improve but pneumonia developed which resulted in the death of both. The medical officer states that in his opinion both deaths resulted from pneumonia caused by the fumes inhaled and that the burns received were not in themselves sufficient to have caused death.

In view of the above there is being undertaken at the New York Navy Yard an investigation to determine the effects of using carbon tetrachloride in confined places as a fire-extinguishing agent.

In order to prevent the repetition of such an accident as above mentioned, the bureau directs that special care be exercised relative to the use of carbon tetrachloride fire extinguishers in confined places, pending the completion of the above-mentioned investigation, and wherever practicable, other efficient means for extinguishing fires in confined places be employed.

The United States Interdepartmental Social Hygiene Board desires a limited number of specially trained workers of both sexes to complete its organization, at salaries varying from \$1,800 to \$4,500 per annum. For information address the United States Civil Service Commission, Washington, D. C.

Lieut. Commander T. Wilson, Medical Corps, United States Navy, reports that during a severe epidemic of yellow fever in Amapala, Honduras, Noguchi's serum of antileptospira icteroides was administered with apparently beneficial results to members of the crew of the U. S. S. *Chicago* who had contracted the disease ashore. The serum was used to vaccinate 500 individuals—sailors and civilians. The services of the Rockefeller Commission engaged in research work in San Salvador were requested and members of this commission came to Amapala and established a laboratory on board the U. S. S. *Chicago*. Dr. Puerijas, of Guayaquil, Ecuador, was also present and helped Dr. Wilson in his work for the sufferers ashore.

The United States Public Health Service announces that the bacterium tularensis first isolated by Drs. McCoy and Chapin, of the United States Public Health Service, as the causative agent of a plaguelike disease of rodents is the cause of so-called "deer-fly disease." This disease is popularly ascribed to the bite of a fly on some exposed part of the body. It is characterized by inflammation and suppuration of neighboring lymph glands and by fever resembling that of blood poisoning and lasting from three to six weeks. About 25 cases have been observed each year since 1917 in Millard County, Utah. There has been one death. Surgeon E. Francis, United States Public Health Service, carried out the investigations establishing the B. tularensis as the etiological factor in the disease.

Dr. William W. Graves, 727 Metropolitan Building, St. Louis, Mo., appeals to the medical profession for contributions of human embryological material to further his studies in regard to certain malformations of the shoulder blade which have a significant bearing on growth and development and on resistance to disease, etc. Specimens should be completely immersed in 10 per cent formalin in a sealed container as soon as delivered and sent, charges collect, to the above address.

The regular medical establishment of the French Navy consists of 351 medical officers and 49 officers in the pharmaceutical branch. The need for an increased personnel is keenly felt, but the naval budget does not warrant expansion at present.

The year 1919 was marked by the celebration of two important centenary anniversaries; that of the birth of James Watt, of Greenock, Scotland, who made the steam engine a practical possi-

bility by the employment of the separate condenser; and that of the publication of the "Treatise on Mediate Auscultation" by René Théophile Hyacinthe Laënnec. It was Auenbrugger who developed auscultation but Laënnec invented the stethoscope, elaborating on the simple idea of rolling a sheet of paper into a cylinder and using this to transmit sound from chest to ear.

During the course of the Navy's recruiting for war service two cases of lateral transposition of thoracic organs were encountered. The heart was on the right side. In neither was there any apparent interference with cardiac function.

The Policlinico of Rome (XXVI, 27, July 6, 1919), contains a thoughtful, dispassionate comment on our new total abstinence law beginning with the words: "In the matter of social legislation there is no joking in the United States." The writer continues:

Now, while far removed from the contemptible viewpoint of those who maintain the individual's right to become intoxicated it seems to us that the American enactments are somewhat exaggerated and go beyond the mark by attacking the legitimate habits of a large number of persons. It is no more than right to eliminate beverages with a high alcoholic content whose toxicity is increased by impurities and other products, and we heartily subscribe to the proposed suppression of these inciters of serious intoxications as damaging to the race. On the other hand the attempt to forbid the orderly citizen from washing down the meal enjoyed in the sanctity of the home with a small glass of wine, because if he drank to excess it would hurt him, may lead to unfortunate results by spurring him to reaction and to all sorts of subterfuges to evade the law.

The writer concludes with a comment on the bar-room evil. If "Index" knew how universally the "orderly citizen" of America was engaged to-day in the concoction of homemade beer, wine, "monkey rum," blackberry cordial, dandelion wine, *et id omne genus*, assisted by wife, daughter, man servant, maid servant, and the stranger within his gates, he would make prophecy his profession.

In *Hospital Management*, Vol. VIII, No. 4, November, 1919, Dr. Carl Meyer, assistant warden of Cook County Hospital, Chicago (2,700 beds; daily average of patients 1,850), is thus quoted:

Since prohibition went into effect there has been a marked decrease in our hospital population. We are running about 500 less than usual, our average at present being around 1,300. We are getting very few accident cases, the former record of 25 to 50 on Saturday nights having been reduced to one or two. Alcoholics have been almost eliminated, and accidents due to this con-

dition, as well as medical cases growing out of exposure, have been practically nil. In fact, the "typical bum" who used to make up a large percentage of the hospital is rapidly becoming obsolete. High wages, of course, may have had something to do with this.

By reason of the fact that we are now handling fewer patients than at any other time since 1909, our needs are changing. We were formerly overcrowded, but with the reduced number of cases coming to us for attention, it looks as though our present facilities as far as general hospital work is concerned, will be sufficient for eight or ten years to come. Branch hospitals were formerly being considered, and these now may be unnecessary. We need a children's hospital, and other special facilities, but as far as our general work is concerned we are in excellent position, and will be able to take care of the needs of an increasing population for another decade.

The paper by Edward Reynolds of Boston on "Practical Points and Common Errors in the Treatment of Sterility," which appeared in the Jour. Am. Med. Assn., October 11, 1919, is a most thoughtful and valuable contribution to the literature. No one is better qualified than the author to discuss this subject as it has occupied his attention and been studied by him both from the clinical and histological standpoint for many years.

Lieutenant Commander R. W. Waterhouse and Lieutenant R. G. Reaves, Medical Corps, United States Navy, report gratifying results from injections of pilocarpine in 50 uncomplicated influenza cases. Pilocarpine is a drug which must be used with care and the preparations on the market are not always satisfactory. If elimination is desirable in this disease pilocarpine deserves to be thought of since it stimulates secretion from the glands of the mouth, throat, nose, and deeper respiratory passages; from salivary and lachrymal glands, from the pancreas, and above all from the sweat glands.

A death under anesthesia.—The immediate handling of the anesthesia and patient was done by Lieutenant F. W. Granger, Medical Corps, United States Navy, while Lieutenant L. F. Sise, Medical Corps, United States Naval Reserve Force, stood by his side and directed and helped him. The patient was started under gas and oxygen, but took the anesthetic very badly from the start. He turned so cyanotic and continued to struggle so that ether was added to the mixture, and probably one-half to three-fourths ounce of this was used altogether. Ether was stopped soon after he became quiet. He remained cyanotic in spite of an increasing percentage of oxygen, but the pulse remained good. He had marked obstruction from the tongue, which was very difficult to free by manipulation of the jaw. A rubber pharyngeal tube was accordingly introduced through the nose, but

little good. Up to this time there had been very little mucus or other fluid in the respiratory passages, not enough to interfere with anesthesia; but a little had been collecting, the breathing was considerably obstructed by the tongue, the patient was considerably cyanosed, as is common with most alcoholic patients under gas and oxygen, and a considerable and increasing amount of oxygen was being given; but the pulse was good and he was coughing occasionally. At this point the pleura was opened by the operator, and immediately a gurgling as of considerable fluid in the breathing passages was audible and respiration became almost entirely obstructed. He was put on straight oxygen, the hole in the chest wall was plugged with gauze, and the table tipped up to the high Trendelenburg position. A thick, foul-smelling material began to flow through the mouth and nose. A Lumbard throat tube was inserted and held so as to pull the base of the tongue forward, and artificial respiration was not very effective. A certain amount of air could be heard passing in and out, but no really effective amount was obtained at any time. Total time was 20 minutes to half an hour. It is believed that death was due to a flood of pus rushing into the trachea when the pleura was opened, producing increased pressure and rupture of some of the multiple abscesses which were found in the right lung at autopsy.

On November 13, 1919, were held the dedicatory exercises for the State University Hospital, Oklahoma City, Okla., an institution founded primarily to furnish hospital service to those who would otherwise be unable to secure such service. On an order from the county commissioner such patients are received at a nominal cost to the county. Persons of limited means will be admitted on certificate from their physician or the county health officer on payment of hospital service and receive medical and surgical service free. Of the 175 available beds only 25 are in private rooms.

A continuous decline in the birth rate of the city of Manila has been observed during the last few years. This will be made the subject of a special investigation by the Philippine health service in the near future.

The French Government recently appropriated 8,590,000 francs to the faculty of medicine of Paris. Considerably more than half of this sum is for the purchase of a large tract of land (on the left bank of the Seine, in the heart of the Latin Quarter) which is already

occupied by substantial buildings available for clinics and laboratories and for the establishment of the proposed institute of hygiene. The balance of the appropriation will be utilized for the expansion of clinical facilities, the children's department being particularly in need of a larger number of beds.

Since 1860 the number of blind children under 5 years of age in the United States dropped from 66 per million of population of the same age to 52 in 1910. There has also been in this period a decrease of the blind under 20 years of age, from 20.1 to 10.5 per cent of the blind. Since 1880 there has been an absolute decrease in the number of blind persons. From 1860 to 1910 the percentage of blindness in children under 1 year of age dropped from 0.3 to 0.1 due to the prophylaxis against ophthalmia neonatorum. The least decrease of blindness in recent years has been among the class of persons aged 60 or over for the simple reason that old age is the period most prone to blindness and as we increase measures for prolonging life we throw more people into the most susceptible category. Thus while the census of 1886 showed that 36 per cent of blind persons were 60 or more years old the census of 1910 showed that 49.4 per cent of the blind belonged in the advanced age category. About one-sixth of all blindness in the United States results from accidents or causes other than disease.

Translated from *La Presse Medicale*, Paris, No. 65, November 5, 1919:

The Eight-Hour Day. No sound from the Press. In Parliament some one rises and says: "The working-man's party wants an eight-hour day."

Forthwith everybody, deputies, senators, those of the right and those of the center, those of the North like those of the South, those who bear the red flag and those who bear the tricolor, all shout with one voice. "The populace has spoken; let its will be done." "Amen." says Clemenceau.

And the eight-hour law was passed.

This vote bares to the quick the psychology of modern legislation. To ponder, to calculate the moral and economical consequences of a law being formulated, to foresee its reaction, to anticipate its recoil would make of political activity a difficult science attainable only for the economist and the sage. Political science would no longer be within the reach of everybody: it would no longer be democratic. Parliament is democratic. It is charged with the making of laws and it brews them. Modern legislative bodies hand out laws in the

dark like a child scattering seed at random without knowing whether the plant that will spring up will be grain or tare, remedy or poison.

It would have been hard to find a more unseasonable law; a more powerful means to increase expenditure, reduce production, paralyze commerce and industry, and hinder the reconstruction so necessary to our country. The departments of government, the executives of the State or of cities had to recruit thousands and thousands of new employees. It was clearly an astute move by which to find places for discharged soldiers without getting rid of the people who during the war had taken the places just vacated by the fighters. It was manifestly a convenient means of giving former employees more rapid promotion. On the other hand what a splendid device for attracting the population to our over-populated cities and of robbing agriculture and the productive industries of our country of the physical energy they needed.

So far there is no sign of the improvements brought about by this inopportune law. Who would dare to assert that before this law there existed in France considerable bodies of workingmen overwhelmed with toil? On the contrary, we behold rail-borne traffic becoming dearer and less assured; our ports are choked up; building operations have absolutely ceased; every form of essential enterprise has been put off indefinitely.

The managers of our hospitals, for example, are asking themselves with anxiety how they are to feed, pay, lodge, and even secure the services of the hundred or two hundred or three hundred additional nurses that the law makes necessary for every hospital, however small it may be. Will the sick be better cared for under this law? No; far from it. The heads of the various medical departments will wait in vain for the needed laboratories; the tuberculosis patients will wait for their sanitariums to be built; the wounded will wait for those urgent surgical interventions which wisdom dictates and which most great foreign cities afford.

If the common sense of the people did not counteract the irresponsibility of our legislators we would now be only at the dawn of a day without bread. Why, may I ask, should the farmer's wife work longer than the matron of a hospital? Why should the girl on the farm have a longer day of tending chickens, turkeys, and geese than the precious little stenographer in the cabinet officer's dainty sanctum?

Oh, Parliament, be consistent! Carry your reforms to their logical extent; apply your eight-hour law to the labors of the farm. Then the city dweller will scour the market in vain for an ounce of butter or a slice of bacon, even as the young doctor anxious to

begin practice will seek in vain for a roof to shelter his head—and his illusions.

Demagorus laughs at this wretchedness. A needy creature before the war, he to-day shovels out the millions. What is the price of food to him! If he can't get bread, he will eat cake. Let hunger assail common mortals. Truffles will always be forthcoming for the gilded paunch.

For the benefit of their employees, the Chicago packers, Libby, McNeil & Libby inaugurated on July 1, 1919, a medical organization of their own. The staff consists of a full-time surgeon, in charge, with an assistant each for the day and night working time, a full-time trained nurse, a stenographer, and a record clerk. The medical department attends to all sickness or injury developing at the plant and averages about 60 cases daily. A reception room, 2-bed ward, operating room, sterilizing room, fully equipped with modern beds, instruments, sterilizers, lavatories, etc., constitute the material installation.

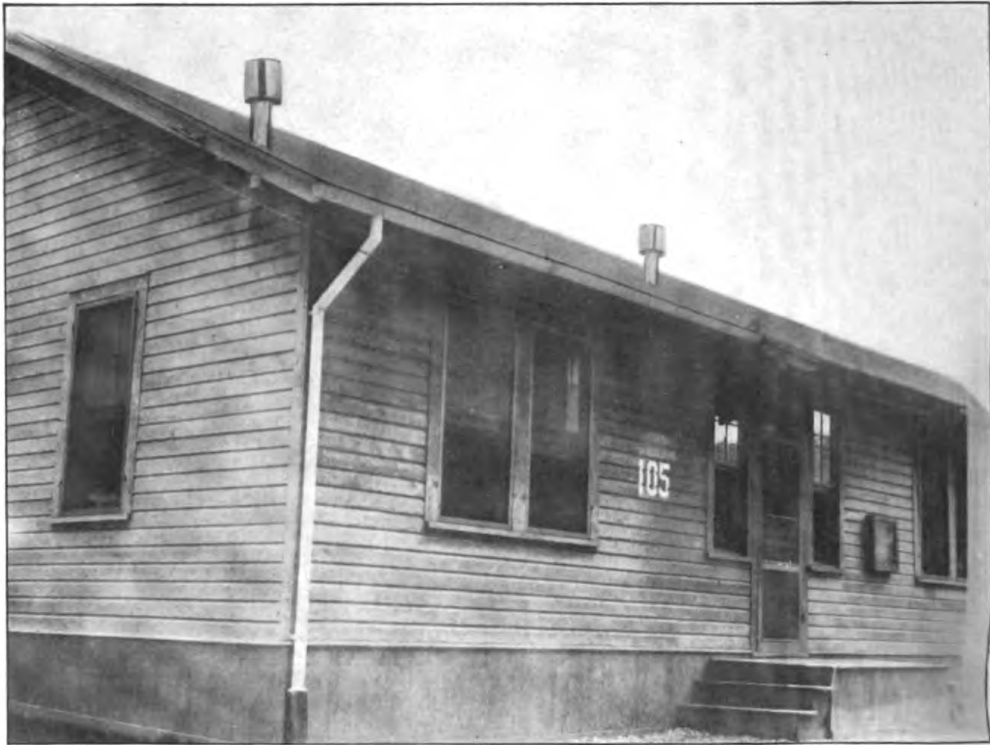


Receiving Ship Barracks, Bay Ridge, N. Y. Entrance on Seventy-ninth Street.



Receiving Ship Barracks, Bay Ridge, N. Y. Main mess hall, south entrance.

162-1



Receiving Ship Barracks, Bay Ridge, N. Y. Building for examination of outgoing drafts, discharged men, and recruits.



Receiving Ship Barracks, Bay Ridge, N. Y. The two buildings in the foreground compose an isolation unit.

162-2

REPORTS.

THE MEDICAL DEPARTMENT OF THE RECEIVING SHIP BARRACKS, NEW YORK.

W. G. FARWELL, Commander, and R. M. KREPPS, Lieutenant, Medical Corps,
United States Navy.

Necessity, in addition to being the impelling force of invention, is likewise power behind extension and expansion. One proof of this is the modern receiving ship, or, to use the term which more aptly describes it, the receiving barracks. The recent war wrought many changes in the operation of the Navy, and as each branch of the organization responded to the needs, many radical changes resulted. Chief among these is the modern receiving barracks. With the inauguration of new methods of housing and transferring men, preparatory to sending them to sea or to shore stations, new problems arose and among them were many which were solved by the medical department.

Since the health of the enlisted personnel is a paramount issue in the conduct of a victorious war, this can be readily understood; and as the present type of receiving ship was being evolved, growth and improved lines was demanded by all departments, and through experience and correction of errors a nearly perfect unit has been established at the barracks at Bay Ridge. Nothing but the highest praise can be offered to the commanding officer, Captain G. L. P. Stone, United States Navy, for his efficient management and excellent cooperation with the medical department in attaining its purposes.

As a matter of information and comparison it is important to discuss the history of the receiving ship at New York before the construction of the present station.

Since the discontinuance of the old *Hancock* as the receiving ship at New York, and its subsequent commissioning as a Navy transport for the Marine Corps in August, 1913, the U. S. S. *Washington*, U. S. S. *Maine*, and the U. S. S. *New Jersey* were at different times used as receiving ships. At the beginning of the war the U. S. S. *New Jersey* was still being used as such, but was soon thereafter attached to the Atlantic Fleet. In the place of the *New Jersey*, such

ships as were available in the navy yard at the time undergoing repairs were used for receiving-ship purposes.

Until August, 1917, when the City Park Barracks, Brooklyn, were placed in commission as a part of the receiving ship, the different interned German liners undergoing repairs and conversion to Navy transports were placed in use as receiving ships. This was not a desirable plan, but was the only one available. Quarters thousands of men on a ship which is undergoing extensive repairs does not conduce to ideal sanitary conditions or the contentment and efficiency of the complement on board.

The City Park Barracks, adjacent to the navy yard on Flushing Avenue, Brooklyn, continued as a part of the receiving ship until the armed guard detail was established as a separate unit from the receiving ship, when the barracks were assigned to that organization.

During the summer of 1917, when the conversion of the interned liners had been completed, the Hudson River steamers *Adirondack* and *C. W. Morse* were chartered and brought to the navy yard and used for receiving-ship purposes. It soon became apparent that they would not be sufficient to meet the requirements of the ever increasing number of men on general detail.

Negotiations were started for taking over Ellis Island in its entirety, the intention being to transfer all receiving-ship activities to that place. After several conferences with the Army port officials it was decided to allot to the Navy Department only one-third of Ellis Island. This part of the receiving ship was used as an overflow station.

Ellis Island has since been turned over to the immigration authorities, that part of the island which had been used as part of the receiving ship having been placed out of commission on April 1, 1919.

During the summer of 1918 a contract was awarded for the construction of receiving-ship barracks in the Bay Ridge section of Brooklyn, on a narrow strip of land adjacent to the river between Sixty-ninth and Eighty-sixth Streets. These barracks were constructed in a remarkably short period of time and occupancy began on November 1, 1918. It is in these barracks that the present receiving ship is in operation. A few general facts concerning the station follow, as well as specific details of the medical department routine.

For information concerning the size of the station the following figures are submitted:

Number of acres covered.....	32.5
Length of station in miles.....	1
Number of buildings.....	99

Buildings in detail:

Barracks in main camp.....	38
Barracks in quarantine camp.....	2
Mess halls; 2 in main camp, 1 in quarantine.....	3
Main dispensaries.....	3
Isolation buildings.....	3
Laboratory.....	1
Animal house.....	1
Reporting-in office.....	1
Reporting-out office.....	1
Recruiting and discharge building.....	1
Power houses.....	2
Disinfector building.....	1
Ragage rooms.....	2
Ships' stores.....	2
Guardhouses.....	3
Post office.....	1
Chaplain's office.....	1
Recreation buildings—Y. M. C. A. and K. of C.....	2
Latrines.....	6
Supply buildings.....	8
Wrig building (barracks, offices, mess hall, dispensary).....	1
Regimental headquarters.....	6
Garages.....	2
Cooks' quarters.....	1
Commissary building.....	1
Barber shops.....	2
Administration building containing captain's office, executive office, pay office, medical office, record room, and detail office.....	1
Crescent Club used for commissioned officers' quarters.....	1
Bathhouse.....	1
Laundry.....	1

The number of officers who passed through between November 1, 1918, and August 1, 1919, was 2,360.

The number of men who passed through the station between November 1, 1918, and August 1, 1919, was 120,500.

ROUTINE OF RECEIVING MEN.

The system by which men are received on the station, billeted, and prepared for transfer to sea, is not complicated in any particular but because it is markedly different from that employed on former receiving ships, it is of interest and further emphasizes the value of a receiving barracks, rather than a ship. To briefly describe the method, the case of one man will be used.

Upon his arrival he is first examined by the medical officer in the building designated for that purpose. Particular care is paid to venereal and infectious diseases. If he is physically fit and the victim of no contagion or infection he is directed to the building known as the reporting-in office. Here a chain of seven cards is typed and the man is given a billet number which he retains as long as he remains

on the station. The cards are sent to the following departments: Medical office, regiment, company, supply office, and detail office. He retains the last card containing his billet number, and the first one is held in the reporting-in office. Thus every department is informed of the arrival of the man.

When this is completed he is sent to Barracks D, used as the clearing station. If he arrives on the station with all papers he is immediately sent to the classified barracks from the clearing regiment. In explanation of these barracks it is necessary to state that the barracks are divided into regiments lettered A, B, C, and D, and are classified as follows:

- A. Engine room force.
- B. Yeomen and commissary branch, all chief petty officers, hospital corpsmen.
- C. Seaman branch.
- D. Clearing barracks and men whose papers are not complete.

As an illustration it may be assumed that the man arriving is a yeoman. Then he will be referred to B-barracks. If, however, he has come on the station with his service record and health record only, he will be retained in "D" until the missing paper, his pay account arrives, when he will become available for transfer to sea, and sent to the classified barracks.

By this method of checkage no man can be transferred to a ship or station without his complete papers. Every man assigned to Regiments A, B, and C is immediately available for transfer.

ROUTINE OF TRANSFER.

The work of preparing drafts for sea and shore stations is carried on in the detail office and the routine followed here is likewise simple and efficient. An order is issued from that office to the regiments concerned specifying the number of men and rates required. The reply to this order is known as a "Stand-by letter," which is a list of men selected for the draft, and is forwarded to the detail office and the assemblage officer in the reporting-out office. An order of transfer is issued to close out the pay accounts, health record, and service record of the man, and a letter of transmittal is prepared. The above records are then forwarded to the assemblage desk in the reporting-out office where the man and his records are checked. Meanwhile the man has been sent from his regiment to the reporting-out office and with his checked papers is transferred.

A record of every man who passes through the station is kept. This is done on a card held in the detail office, known as a "Five by eight," because of its dimensions, 5 by 8 inches. On this card is the following: Name, rate, date of arrival, ship or station from which he came, billet on his station, date of transfer, and ship or station to which transferred.

MEDICAL DEPARTMENT ORGANIZATION.

While the station was operating at its highest pitch during the summer of 1918 and winter of 1919, when the personnel exceeded 11,000, it became necessary to devise some system by which sick call could be held expeditiously and efficiently. The barracks were so constructed that the two main dispensaries were located at approximately either end of the camp. This made it easy to divide the camp in half and direct the barracks closest to the dispensary in the vicinity to send all men for sick call to that dispensary. Thus men from A and B barracks reported to dispensary M-1 for sick call and those from C and D received attention at M-3. Sick call began at 8.30 a. m., and required about three hours for its completion. When consideration is given to the fact that at that time there were, on an average, 11,000 men on the reservation at all times, the sick call was completed at a fairly rapid rate. There were detailed at the dispensaries 10 and 12 medical officers, and at times more, who were constantly engaged in handling the cases. This method worked satisfactorily as long as there were sufficient medical officers to assign to the dispensaries.

When it is realized that the great amount of work done by the medical department was in charge of officers here on temporary duty, the extreme difficulty of the situation is apparent. At that time there was one permanent medical officer on duty, the senior medical officer, and it was necessary to perfect an organization in the dispensaries with officers who remained on the station from a few days to a few weeks. However, with the permission of the Bureau of Medicine and Surgery, the senior medical officer was permitted to remain on semipermanent duty sufficient officers to act as heads of each medical unit until the routine was so established that it could be taken up by any incoming officer. Certain rules and regulations were established and published in each unit for guidance of the new officers.

GENERAL DUTIES OF OFFICERS.

Medical officers on duty stand watch in rotation, a 24-hour turn, so that there is a medical officer on watch at all times in the dispensaries and draft offices. Each has a relief officer of the day, who handles all emergency calls at the barracks to which the unit is attached. The hours of all officers who are not on watch are from 9 a. m. to 5 p. m. All officers who are on temporary duty are assigned for duty at the dispensaries and draft offices and perform their professional duties at these units until detached.

INSTRUCTIONS FOR OFFICERS ON DUTY AT DISPENSARIES.

Sick call.—Sick call will be held at 8.30 a. m. and 5 p. m. After these hours only emergency cases will be treated unless the man has a valid excuse for not attending at the regular time. A hospital corpsman will be detailed to make all entries in the sick-call record and to write treatment slips for all cases. The medical officer making the examination will fill in the diagnosis and treatment and a hospital corpsman will fill in the name, rate, etc.

Admitting patients to sick list and wards.—All cases to be admitted to the wards or transferred to the hospital will be brought to the attention of the officer in charge, who will designate the wards to which the patients shall be admitted. During the absence of the officer in charge the officer of the day will take care of all admissions, following the prescribed routine. Before admitting anyone to the wards care should be taken to ascertain patient's billet, so that only cases coming under proper units will be admitted.

Contagious cases.—If a case is of a contagious or infectious nature it should be placed in the proper isolation ward. Extreme care must be taken not to mix up these cases. A detailed chart showing available beds will be found in the office of the officer in charge. The appearance of any infectious or contagious disease is to be reported to the officer in charge and senior medical officer, or, in case of absence of both, to the officer in charge (captain's office), stating disease, barracks, and all available information, so that proper steps to enforce an immediate quarantine can be carried out.

Venereal cases.—All venereal cases will be transferred to Dispensary M-6 (quarantine camp) where adequate facilities are at hand for their treatment.

Scabies and pediculosis.—These cases are to be sent to isolation wards, and all clothes, bags, and hammocks are to be sent to quarantine camp for disinfection. No clothes, exclusive of personal effects, will be allowed, other than bedding.

Laboratory work.—Men are to be sent to laboratory M-5 on Tuesday and Friday mornings for blood tests. Special request forms are to be sent with patients in all instances. The chief pharmacist's mate will make out all forms requested.

Routine laboratory work will be done at any time on request, following same routine. When possible, samples of urine should be sent to laboratory at 10 a. m.

Inspection of drafts.—This work is all done by medical officers assigned to building 105. All requests for examination of drafts will be referred to that office.

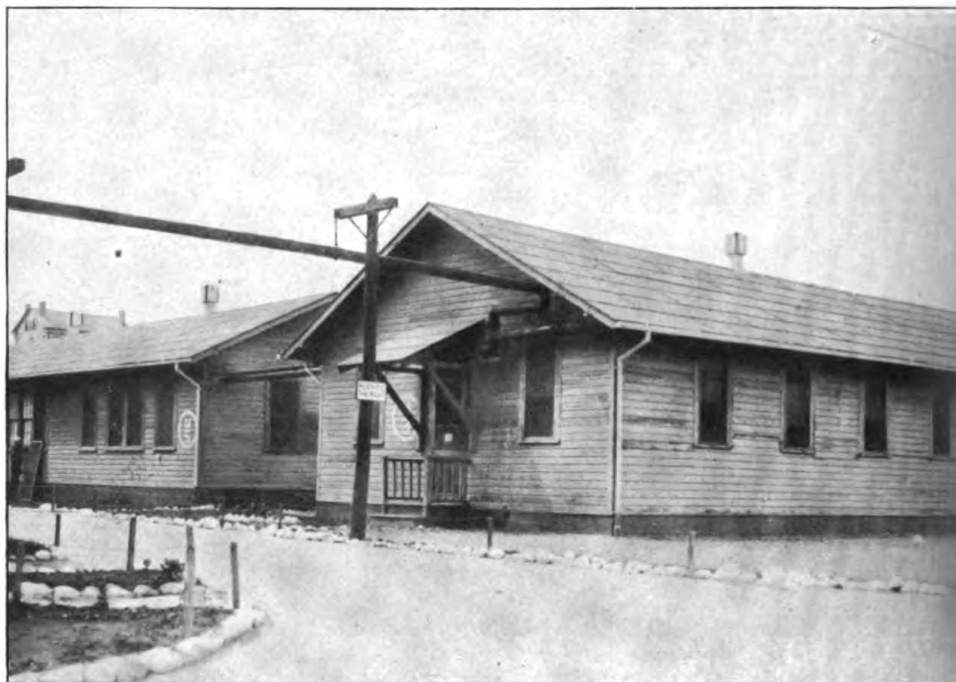


Receiving Ship Barracks, Bay Ridge, N. Y. The dispensary in quarantine camp.

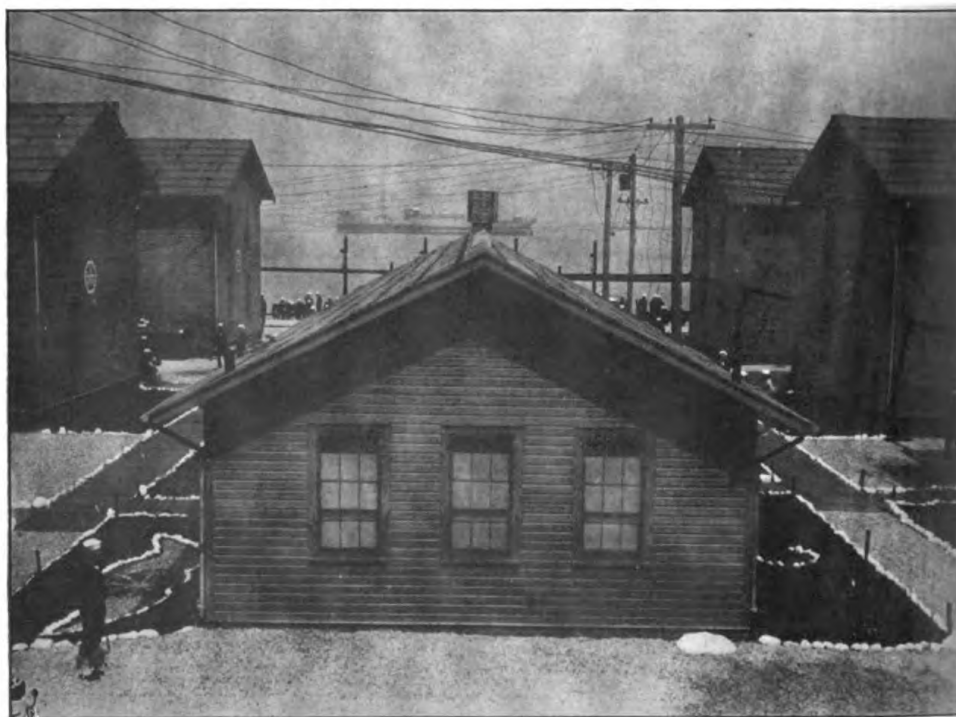


Receiving Ship Barracks, Bay Ridge, N. Y. Sick bay in detention barracks.

168-1



Receiving Ship Barracks, Bay Ridge, N. Y. Dispensary M-3 and laboratory building M-5



Receiving Ship Barracks, Bay Ridge, N. Y. The building in the center contains washroom and latrines for occupants of adjacent buildings.

168-2

Men scratched from drafts.—When men are scratched from outgoing drafts, if from Regiments A or B, they will be referred to Dispensary M-1 for action. Men from C or D will be sent to Dispensary M-3. These men are supposed to be unfit for duty. They should be admitted to the sick list or binnacle list as the cases warrant, and only after a thorough examination, should they be restored to duty the following day. This procedure is absolutely essential, as men detailed on drafts automatically lose their billets and have no status on the station when scratched from a draft. By admitting them to the sick list until their cases can be disposed of, their records and pay accounts are retained on the station.

In case men are referred from the draft office for an opinion as to whether or not they are fit for duty, a written statement should be sent to the medical officer examining drafts, recommending that the men be scratched or returned fit for duty as may be deemed proper.

Men sent from draft office with a proper form from the inspecting surgeon must not be sent back to draft office, but must be handled in accordance with the above routine.

Emergency calls.—In all cases these are to be answered promptly, regardless of location on the reservation. An Army litter and a first-aid pouch are in the chief pharmacist's mate's office of each dispensary, available at all times. The medical officer answering emergency calls will detail two hospital corpsmen to carry the litter and pouch. No special assignment for these men is necessary; the first two available will be used. Attention is invited to the fire bill posted on the bulletin board in the entrance hall of the dispensaries.

Health records.—When cases are admitted to any of the wards of the dispensaries the health records are to be requested at the medical office, administration building, and when received will be properly written up at once. When patients are transferred, health records are to be closed out and turned in to the chief pharmacist's mate, who will make out form "F" cards and return records. This must be expedited so that records are returned the same day that patients are discharged. Use utmost care to check health records in order to prevent any mistake as to name and rate.

Regimental inspection.—Inspections of barracks will be made in accordance with existing orders. These are subject to change from time to time, so that officers will keep themselves informed as to changes. These inspections cover personnel and sanitary conditions. Wednesday inspection will be venereal. Reports are to be submitted to senior medical officer daily. Any cases of concealed venereal disease found will be promptly reported for disciplinary action.

Diphtheria suspects.—When cases are admitted to isolation wards, cultures of throats will be taken immediately and also smears of throats, if there is a suspicious membrane, to be examined for Klebs-

Loeffler's bacilli and organisms of Vincent's angina. These are to be forwarded to the laboratory for examination. In cases of clinical diphtheria give antitoxin, but do not send to hospital until positive diagnosis is made and then only with permission of officer in charge or senior medical officer.

Diphtheria carriers.—These cases will be isolated and given routine treatment until at least three negative cultures are obtained.

Meningitis.—Follow instructions under contagious cases. All cases are to be promptly isolated and diagnosis confirmed by spinal puncture. Sterile tubes can be obtained at laboratory. When puncture is made and fluid is found cloudy or under increased pressure, anti-meningitic serum will be injected immediately and spinal fluid sent to the laboratory. Patients will not be transferred to the naval hospital until a positive diagnosis has been made. Rigid quarantine of barracks from which the case came will be immediately enforced.

Meningitis carriers.—These cases will be handled in the same manner as diphtheria carriers.

Measles and scarlet fever.—These cases will be isolated immediately. Follow instructions under contagious cases. These cases are to be given a hot bath on admission, and a consultation of medical officers shall be called to confirm the diagnosis. Do not diagnose any contagious disease without consultation, if other doctors are available.

Routine between medical units.—When it is necessary to transfer patients from one ward to another, or from one dispensary to another, or discharge them to duty, two proper forms (white) will be made out, stating all particulars, one to go with patient and one to dispensary office. Officers transferring patients will see that these forms are made out in every instance.

When cases are admitted to the wards, a (green) form will be made out and forwarded to dispensary office.

Venereal prophylaxis.—Until new stations are completed at the gates, prophylaxis will be administered in the venereal heads of the dispensaries. The officer of the day will see that a proper entry is made in the record book of the treatment. The venereal head will be in charge of a hospital corpsman, who will be held responsible for its cleanliness.

Alcohol and poisons.—Alcohol, poisonous and narcotic drugs will be kept under lock and key at all times. The key will be in the custody of the officer of the day at all times, and will be turned over to his relief when his term of duty is ended. A note to this effect will be entered in the journal.

X-ray examinations.—Ordinary cases are to be sent to the United States Naval Hospital, Brooklyn, N. Y., before 9 a. m. Emergency cases may be sent at any time.

Cases requiring bismuth series report Monday, Tuesday, Wednesday, and Thursday, 8.30 to 9 a. m. These cases report at hospital without breakfast; they may have a cup of coffee, but are not to receive a cathartic.

INSTRUCTIONS FOR MEDICAL OFFICERS ON DUTY IN INCOMING AND OUTGOING DRAFT OFFICES.

All incoming and outgoing drafts are inspected by a medical officer. The inspection for incoming drafts is held at building 106. Examination of outgoing drafts is conducted at building 105, adjacent to the administration building. Officers who are disenrolled or ordered to inactive duty will receive their physical examination in room 7, building 104. Medical officer in building 105 stands a 24-hour watch.

Return of men from hospitals.—All drafts received at this station, whether returning to duty from the United States Naval Hospital, Brooklyn, N. Y., or elsewhere, after reporting to the reporting-in office, shall report immediately to the medical officer in charge of examining incoming drafts in the reporting-in building.

The medical officer on watch shall immediately make a careful examination of each man to establish whether he is fit for duty, unfit for duty, fit for light duty, or to be recommended for medical survey; and submit a report of the same to the medical officer in charge, building 105.

Detection of contagion in drafts.—Any cases or suspected cases of contagious or infectious disease shall be immediately segregated and the customary reports of same made. If such cases are discovered, the remainder of the draft shall be kept isolated from the men already quartered. The entire draft will be quartered in the quarantine camp. The senior medical officer and executive or acting executive officer shall be notified immediately.

Disenrollment of officers.—When officers are being disenrolled or being returned to inactive duty, take steps to procure their health records for proper entries and consignment to the officer with instructions to the officer to forward the record to the commandant of the district in which he resides.

All routine regarding health records of officers in this respect will be carried out in the same manner as health records of enrolled or enlisted men, observing that health records are properly closed out as well as file cards in the medical office.

All medical officers are instructed to make careful physical examinations of all Navy and Reserve personnel discharged from the service or ordered to inactive duty, and to carefully record all physi-

cal defects and other data in health records, which in each case must be forwarded to the district commandants or to the Bureau of Medicine and Surgery, as the case may be. When practicable each case should be examined by two medical officers. In case physical disability is found, the individual must be examined by a board of medical survey before being discharged or ordered to inactive status.

Notification to outgoing draft office.—When members of a draft are found by the medical officer to be physically unfit for transfer they shall be immediately sent to dispensary M-1 if men have been attached to either Regiment A or B, or to M-3 if attached to either Regiment C or D, with a memorandum stating the reason for scratching. Outgoing-draft office shall also be notified in each case.

Medical officers attached to this unit will note that when men are examined physically for outgoing drafts, whenever a man has venereal disease which in the opinion of the examining medical officer does not disqualify him for transfer, this fact shall be reported by written memorandum to the senior medical officer's office, administration building, giving the man's full name, rate, organization, and ship to which being transferred.

Transfer of men with venereal diseases.—Ordinary cases of gonococcus infection may be transferred to ships having medical officers aboard. This is in compliance with letter from Bureau of Medicine and Surgery dated March 7, 1918. The medical officer who examines the case for transfer should assure himself that every facility is at hand to continue treatment aboard ship. All cases should be accompanied by an explanatory letter stating authority for transfer is given in letter from Bureau of Medicine and Surgery dated March 7, 1918.

MEDICAL OFFICER IN ATTENDANCE UPON SICK OFFICERS AND MEN OFF THE STATION.

A medical officer is detailed by the senior medical officer to make all outside calls. This officer visits sick officers and men who report their illness to the senior medical officer. All reports of illness on the part of officers or men at home which are received by line officers of the day on duty at this receiving ship should be submitted immediately to the senior medical officer's office, in order that they may be visited by a medical officer. Sick officers will not be transferred to the hospital, except on written order from the senior medical officer, except in emergency. The medical officer on this duty submits a report, immediately after visiting the case, by telephone to the yeoman who is detailed to make out the report for the commanding officer and medical department files. In this report the medical officer states the diagnosis, probable duration, and recommendations.

There is a medical officer on duty at the Detention Barracks from 9 a. m. to 5 p. m. Sick call is held three times a day, at which time prisoners report to the dispensary for examination and treatment.

All prisoners who have to undergo confinement in pursuance of the sentence of a court-martial are examined to determine if they are physically fit for such confinement. A list of names of these men is obtained from the warden. When the men are examined a list is submitted to the senior medical officer's office stating whether the men are fit to undergo confinement or not.

Finger prints of prisoners.—The medical officer detailed to hold sick call will draw up for all prisoners reporting in at the brig who have no health or service records a complete skeleton health record on form N-Nav 2, with descriptive list. A finger-print outfit and sufficient forms will be on hand at all times. The medical officer will keep a file of all finger prints made and health records will be sent immediately to the medical office, administration building.

MEDICAL OFFICER ON DUTY AS SANITARY INSPECTOR.

A sanitary officer makes daily inspection of the barracks and submits a weekly report to the captain via the senior medical officer. He reports all conditions which require sanitary measures and makes recommendations for improvement for the sanitation of the station. He also submits a monthly report on sanitary conditions of the station, which is forwarded to the Bureau of Medicine and Surgery, by the senior medical officer through the commanding officer.

MEDICAL OFFICER ON DUTY AS COMMISSARY INSPECTOR.

This officer is on duty at the commissary department, mess hall and galley, between the hours of 9 a. m. and 5 p. m. He inspects the food which is received and makes sanitary recommendations in reference to galley and mess hall to the officer in charge. The hygienic condition of the men at work in the galley, bake shop, and mess hall are also observed by this officer, and recommendations submitted.

GENERAL ORDERS FOR MEDICAL OFFICERS IN CHARGE OF UNITS.

Medical officers will refer all requests for leave from hospital corpsmen to their respective regimental commanders. They will not recommend special liberty for hospital corpsmen. All requests for general passes for hospital corpsmen on duty in different units will be forwarded to the senior medical officer's office for approval.

EXAMINATION OF MEN PRIOR TO BOXING OR WRESTLING CONTESTS.

Upon request from the athletic officer, medical officers in charge of units will order a medical officer attached to the respective units to examine all men prior to engaging in boxing or wrestling contests. In the event that the man is found physically unfit, he will not be permitted to engage in them.

DETACHMENT OF MEDICAL OFFICERS AT UNITS.

When medical officers attached to individual units are either detached, go on leave, or return from leave, medical officers in charge of units will immediately inform the senior medical officer of the same by telephone, confirming this by written memorandum.

When a medical officer receives his orders detaching him from this station, he will immediately report to the senior medical officer and the medical officer in charge of the unit to which he was attached.

Medical office.—The medical office of the barracks is located in the administration building. The large main office is used for the general routine clerical work of the department, while the smaller room is the senior medical officer's private office.

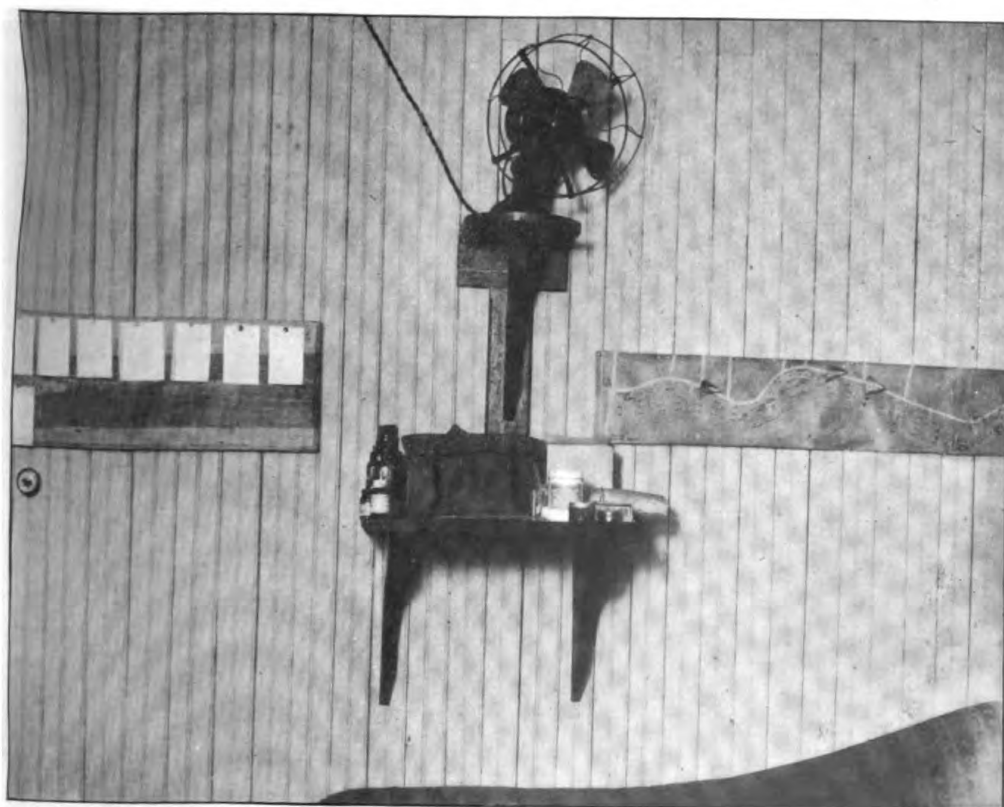
All the health records of the officers and men on the station are kept in one large central file in the medical office. When health records are received a file card is made and filed simultaneously with the health record. As the health records are assembled for transfer with drafts of men and so transferred, the disposition of each health record is noted on the respective file card. In this manner a complete permanent record is maintained of the disposition of all health records.

The general correspondence work of the medical department is carried out in this office and all files of reports to the Navy Department and files of correspondence are kept here. All Bureau of Medicine and Surgery reports are prepared and forwarded from this office.

Detail of hospital corpsmen to ships and stations.—By authority of the commanding officer, the senior medical officer has been acting as detail officer for the hospital corpsmen. Ships which have vacancies in their ratings when requesting men are referred to the medical office, where a file of hospital corpsmen is kept, alphabetically and by rates. From this the drafts of men are composed as required. All the clerical work of assembling service records, pay accounts and health records, letters of transmittal and orders to proceed is carried out by the clerical force of the medical department under the supervision of the senior medical officer and the pharmacist.

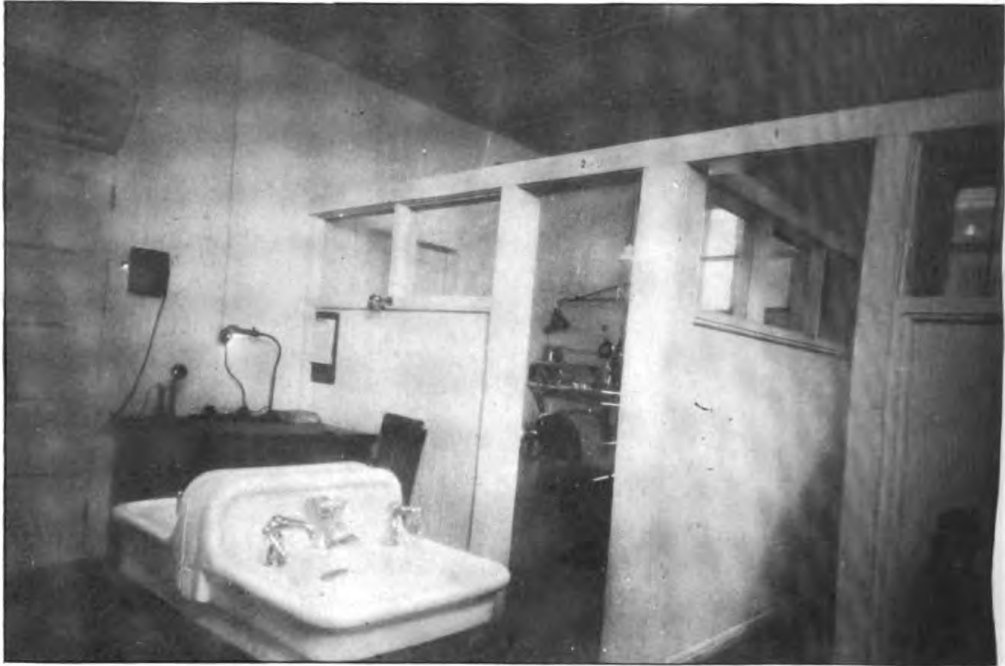


Receiving Ship Barracks, Bay Ridge, N. Y. Medical Department office.



Wall of senior medical officer's office, showing method of observing contagion-controlling plan of camp to right and officer's detail board to left.

174-1



Receiving Ship Barracks, Bay Ridge, N. Y. Dentist's office and operating rooms.



Receiving Ship Barracks, Bay Ridge, N. Y. Disinfection Building, Quarantine Camp.

174-2

Transfer papers of patients.—Through an order of the commanding officer, the senior medical officer is also charged with the assembling and forwarding of transfer papers of patients going to the hospital.

The routine referred to in the two preceding paragraphs has been found to be very feasible. In the matter of transfer of hospital corpsmen the senior medical officer, acting as detail officer, has been able to meet the wishes and requirements of the Bureau of Medicine and Surgery in a better way than would otherwise be possible. As the hospital corpsmen on the station come under the supervision of the senior medical officer and his assistants, it is possible for him to make transfers more intelligently than could be possible were this work handled by another department.

The plan of assembling and forwarding the transfer papers of patients to the naval hospital by the medical department has been found to work out advantageously, for the reason that when the status of a man as a patient becomes established, the concentration of all the routine work in one department makes possible the more expeditious transfer of the men and papers.

Detailing medical officers on temporary duty.—As there are at present but five medical officers and one dental officer attached permanently to the receiving ship, it devolves upon the officers on temporary duty to carry on the greater part of the routine medical work. Unfortunately, in some instances, particularly with officers who are still new to the service, this fact is not realized, and they are frequently ignorant of the great amount of routine work necessary to successfully carry on the functions of a modern receiving ship.

All medical officers on temporary duty are assigned by the senior medical officer to the units where their services are most needed, and the fact that work is required from all hands is impressed upon them.

Requests for assignments to duty are frequently referred to the bureau, and the consideration these requests always receive has tended greatly toward the contentment of officers on temporary duty.

Owing to the fact that transfers of officers on temporary duty are occurring daily (the total number of medical officers passing through this receiving ship for the first six months of 1919 approximated 360), it became necessary to devise a plan whereby a correct record could be kept of all medical officers reporting for duty and being detached.

Upon reporting for duty, each medical officer is assigned to the draft office or a dispensary, and his name placed on the card of the unit to which assigned, which is kept on the detail board; it is also placed on the alphabetical file of medical officers kept in the senior

medical officer's office and on the officers' file card kept in the main medical office. Finally, a record of each officer on the station is kept in the captain's office, so that by this quadruplicate filing errors are fully eliminated.

DESCRIPTION OF DISPENSARIES AND ISOLATION UNITS.

The type of dispensary on the station is a one-story wooden structure, 200 feet long and 30 feet wide. It is not properly termed a dispensary because its function is more than that of a dispensary. In fact, it is a small hospital and is operated under the same routine as that employed in a naval hospital. The building contains one general ward with a capacity of 28 beds, a diet kitchen, baggage room, operating room, office, officer of the day's room, hospital corpsmen quarters, venereal prophylaxis room, shower baths, and toilets.

Adjacent to each main dispensary building is the building containing the isolation wards, which has a bed capacity of 40. These buildings are constructed in two wings, with no communication between them. One wing is divided into two wards in each of which approximately 15 cases can be accommodated. Between the two is a room with glass partitions for use of hospital corpsmen on watch. The other wing is divided into four rooms, in each of which two to three cases can be isolated, and if necessary more can be easily placed therein. Between two of the larger rooms is a compartment with windowed sides in which a hospital corpsman on watch may observe both rooms. During the influenza epidemic both wings of these buildings were filled beyond their normal capacity, but no markedly unfavorable results were noted.

Two dispensary units identical in every respect with the one described above are situated, as has been stated, at either end of the camp and in these the medical department pursues its endeavors.

Quarantine barracks dispensary, M-6.—The third unit is known as the quarantine camp dispensary and is located well beyond the final housing barracks. The construction of this building is similar in general detail to the other type with the exception that there is no large ward. The entire space is divided into rooms in which the cases can be isolated more effectively.

The quarantine camp designed primarily for the use of incoming drafts in which communicable infectious diseases are detected, is available for the immediate reception of the inmates of any barracks on the station in which contagion might arise. In this way the entire personnel from a contact barracks could be transferred into the barracks at the quarantine camp and be retained therein until the epidemic subsided. This camp has its own galley, mess hall, and routine administration buildings, and is an ideal quarantine unit. It is sur-

rounded by a double wire fence to prevent unauthorized communication with the outside.

Isolation of venereal cases.—Inasmuch as the camp has not been constantly in use for the purpose for which it was designed, and because isolation of venereal cases under treatment is desirable, it has been recently taken over in part for that purpose. One, two-decked barrack has been devoted to the use of cases of venereal origin, i. e., specific urethritis and syphilis, and these venereal cases are detailed for the necessary working parties in the quarantine camp; the other barrack is kept available for contagious contacts, and has its own separate toilet facilities.

The upper deck of the venereal barracks is assigned to syphilitics and the lower deck to the gonorrheal cases, each group having separate mess gear and toilet facilities.

In this building a venereal treatment room has been constructed by installing partitions at one end of the lower deck. This room is equipped with every facility for irrigations, injections, etc., useful in the treatment of venereal disease. A urinal trough especially adapted to this work is installed along with other necessary plumbing equipment and a sterilizer. Thus all cases of venereal diseases are immediately and successfully segregated, and each case kept under the personal supervision of the medical officers attached to the quarantine camp.

Quarantine of other units.—During the past winter upon several occasions contagious diseases of more than one type occurred via incoming drafts. In April, 1919, diphtheria, scarlet fever, mumps, measles, cerebro-spinal fever carriers, and cases of Vincent's angina developed almost simultaneously. As there are but two barracks in the quarantine camp, it became necessary to quarantine various barracks in the main camp, and the fact that the spread of these diseases was soon checked was due in a large measure to the prompt and vigorous cooperation given by the commanding officer.

A medical officer was detailed to each regiment to make inspections twice daily of the personnel and barracks, and in this way numerous incipient cases that developed after incoming drafts had been examined were quickly recognized and isolated.

Method of contagion-control observation.—A large blue print showing the serial numbers and location of all buildings on the station is kept in the senior medical officer's office. As soon as a contagious case develops in any barrack, the case is at once transferred to one of the isolation wards and the barrack quarantined. A small red cardboard flag, on the reverse side of which is written the type of contagious disease, date of onset, length of quarantine required, and number of contacts in building, is pinned on the blue print over the quarantined barrack, thus giving a graphic descrip-

tion of all foci of contagion, date when quarantine may be lifted if no further cases develop, and number of men under quarantine at all times.

The following chart shows the number and types of contagious disease that developed at the receiving-ship barracks from November 1, 1918, to July 1, 1919, which is not considered excessive in view of the constantly shifting personnel, there having been as many as 1,000 men in incoming drafts and 1,132 in outgoing drafts in one day.

	Nov., 1918.	Dec., 1918.	Jan., 1919.	Feb., 1919.	Mar., 1919.	Apr., 1919.	May, 1919.	June, 1919.	Total.
Measles.....	0	1	1	8	11	1	2	.....	24
Diphtheria.....	4	13	6	5	1	6	1	1	37
Mumps.....	8	6	27	39	20	22	81	5	208
Influenza.....	62	62	105	334	264	149	92	26	1,194
Scarlet fever.....	1	.....	2	3	2	3	9	1	21
Pneumonia.....	3	9	14	13	7	6	8	1	61
Cerebro-spinal fever.....	.....	1	.....	.....	.....	2	.....	.....	3
Ultero-membranous angina.....	.....	3	1	8	19	38	35	31	135
Chicken pox.....	.....	.....	.....	.....	.....	1	.....	.....	1
Total.....	.....	.....	.....	.....	.....	.....	.....	.....	1,684

The total admissions and readmissions of all diseases January, 1919, to June, 1919, were 5,869.

Laboratory.—The clinical laboratory of the receiving barracks came into existence in the early part of December, 1918. At this time an outbreak of diphtheria threatened the station and a hurry call was sent to the Bureau of Medicine and Surgery for one of Rear Admiral Stitt's "traveling laboratory units." After coping with the conditions present at that time, our own laboratory was organized as the permanent supplies for the laboratory arrived. The traveling unit left in January, the hospital corpsmen in it being replaced by men from the station trained at this laboratory.

The laboratory is a separate building divided into three main rooms. These handle, respectively, (a) bacteriology and clinical microscopy; (b) media, stains, and chemical preparations; (c) serology, autogenous vaccines, etc. A separate building, which is adjacent, houses the animals necessary for use in this work. Work tables, desks, stands, cabinets, and lockers were built in the carpenter shop of this station from specifications drawn up by the medical officer. Mess tables proved satisfactory substitutes while these articles were under construction. The equipment of the laboratory is sufficient in detail for all routine work and gives this station one of the best equipped clinical laboratories in the Navy. It is complete from electric incubator to platinum-iridium needles.

The work carried on is mainly to aid in diagnosis. This is due to the fact that men who develop serious conditions are immediately sent to the hospital after tentative diagnosis is arrived at, the laboratory aiding in the diagnosis. In addition to clinical work, the laboratory has within the last three months taken over the making of media for supplying the Atlantic fleet and transports. During this period it shipped out 13,500 tubes of Loeffler's medium and 3,100 tubes of agar-agar slants. The following is a list of the routine work of the laboratory from January 1, 1919, to July 1, 1919:

CULTURES.

Throat cultures for <i>B. diphtheriae</i>	2, 196
Naso-pharyngeal cultures for meningococcus.....	218
Blood cultures.....	30

SMEARS.

Throat smears.....	1, 672
Urethral smears.....	646
Malarial smears.....	53
Eye smears.....	15
Penile lesion smears.....	48
Gum smears.....	20
Nasal smears.....	20

COUNTS.

Red blood counts.....	34
White blood counts.....	542
Differential counts.....	72
Spinal fluid cell counts.....	5
Hemoglobin estimations.....	42
Coagulation time.....	10

TESTS.

Noguchi tests for syphilis.....	1, 225
Widal tests for typhoid.....	5
Alkaloid tests.....	6
Von Pirquet tests for T. B.....	12
Virulence test for <i>B. diphtheriae</i>	2
Schick test.....	90
Spinal-fluid tests (Nonne, Apfelt, Pandy, etc.).....	5
Pneumococcus-type determinations.....	22
Gold-chloride tests.....	3

MISCELLANEOUS.

Sputum for T. B.....	235
Urinalyses.....	863
Feces for intestinal parasites.....	25
Water analyses.....	5
Milk analyses.....	5
Gastric-contents analyses.....	6
Autogenous vaccines given.....	387
Gonococcus vaccines given.....	22

Detention camp.—The medical department organization at the detention camp consists of one medical officer, one pharmacist's mate first class, four hospital corpsmen on permanent detail, and others temporarily detailed when available on the station. The medical office and dispensary occupy a room to the left of the entrance to the barracks. Here sick call is held three times daily, medications and treatment are administered, and surgical dressings applied. There is a ward with a capacity of 16 beds in the barracks for the use of cases not ill enough to be transferred to the naval hospital. All cases of men absent overleave on account of sickness at home are investigated by the medical officer, who obtains the doctor's certificate covering period of illness. History and physical findings are taken into consideration as to whether a man's absence was satisfactorily accounted for by reason of illness or not.

Finger prints (N Nav-2), descriptive lists and skeleton health records are made on all general court-martial cases, action Navy Department cases, all men held for fraudulent enlistment, under-age enlistment, forgery or embezzlement, unauthorized wearing of United States Navy uniform, or any other cases requiring records for purpose of identification. An average of about 15 finger prints are made each day, and at times they run as high as 20 or 30. The highest number made in one day was 42. The average number of prisoners in July, 1919, was 468.

Venereal cases, gonorrhea acute and chronic, receive treatment, both internal medications and local injections, three times a day. Treatment consists of silvol, 15 per cent injections, followed by zinc sulphate, one-half per cent, as soon as the discharge decreases to a few drops daily. Smears are taken each week; prostatic massage is given twice a week. Cases of acute gonorrhea, in solitary confinement on bread and water with full ration every third day, respond very promptly to treatment, with practically no complications, the discharge clearing up within two or three weeks. All cases of acute and chronic gonorrhea doing extra duty, or restriction, etc., which involves some work but full rations, are more prone to develop complications, such as epididymitis, and have a more purulent discharge, and respond to the same treatment as above in from four to five weeks longer. Observations were made in a series of about 100 cases, 50 in each group.

Previous to the completion of a small six-bed ward in March, 1919, constructed by putting a partition through one end of the mess hall, it was necessary to transfer sick prisoners to a dispensary to be admitted to the sick list. The medical department was held responsible for the safe-keeping of all prisoners when placed on the sick list, thus making it necessary to detail hospital corpsmen to act as guards, reducing the list of available corpsmen for medical work.

This ward was enlarged and now contains 16 beds and is used for all mild cases of illness. Cases of a more severe nature or contagious cases are transferred directly to the United States Naval Hospital, Brooklyn, N. Y., for further treatment. This transfer of seriously sick prisoners to the naval hospital is necessary because there is no brig ward in any of the dispensaries. As the result of the installation of a sick bay in the detention barracks, it is no longer necessary to detail hospital corpsmen as guards, and they can now be used to better advantage in performing the duties of their rating in the dispensaries.

DENTAL DEPARTMENT.

The original dental equipment of this receiving ship while located at the navy yard consisted of one old-style navy standard outfit. This was augmented by another when Ellis Island was taken over. Later one of these was replaced by a new Navy standard outfit, the old one being transferred to the present barracks.

Increased personnel required additional dental officers and equipment, and, as a result, in 1918 three new outfits were added. They were assigned to the two dispensaries. This made three separated dental operating rooms, each containing two outfits.

Practice proved this to be a wasteful arrangement, showing duplication of records and other errors in administration. Ellis Island was abandoned March 31, 1919, and all dental equipment and supplies were then transferred to Bay Ridge. From the two old outfits the best was selected and retained. The remainder was surveyed, and the fit for issue was returned to the United States Naval Medical Supply Depot, Brooklyn, N. Y.

Plans were formulated to centralize and further systematize the dental treatment, since the necessity and value of this was observed when the receiving ship was greatly congested. The result was the establishment of a central dental operating room containing four new Navy standard units in dispensary M-1. Each is inclosed in a wooden and glass partition, separating each unit, and all open into a central combination office, waiting, and record room. Wash basins are installed in this central room for use of each operating unit.

Light and ventilation are obtained by the three-sided exposure and congestion is relieved by two entrances. A supply locker and locker for the stowage of linen and operators' and hospital corpsmen's outer garments adjoin these rooms.

An additional dental operating room was established in the quarantine barracks, dispensary M-6, consisting of an old Navy standard outfit. This was to avoid circulation of contacts, suspects, carriers, and venereals, through the barracks. This unit also handles all cases

arising in the detention barracks. The main dental office receives all cases from the general barracks, including patients sent from ships and stations on which there is no dental officer.

The record system consists of one filing cabinet, made on the station, comprising six drawers, two for 3 by 5 cards, two for health record sheets, and two for stock cards. On the 3 by 5 card is recorded the name, rate, date, time, operation, and unit to which the man is assigned. These are filed as "current" while patients are under treatment or returning for further treatment, and as "completed" when the work is finished and when patients fail to appear for further treatment or are transferred. Thus at any time the status of any patient is immediately available. Reports, form "K" dental, are compiled monthly and are greatly facilitated by this system.

On a man's appearance for dental treatment the dental sheet of the health record is immediately obtained. If none is available, one is made out. These are again filed as "current" or "completed." The completed ones are returned to the original files twice daily to avoid delayed forwarding by mail, in case of transfer.

The total number of cases receiving dental treatment during the six months ending with June, 1919, was 1,676. The average for five units was 400 cases per month.

WEEKLY CONFERENCES.

In order to bring before all the medical officers any interesting or obscure cases which developed on the station or arrived in a draft, a weekly conference was held in the officers' mess hall. At these meetings papers relative to the cases were read, and if the patients were able to appear they were brought to the clinic. In this way all officers became acquainted with cases of interest and instruction which were admitted to dispensaries other than the one to which they were attached. These conferences were maintained during the autumn of 1918 and winter of 1919, but as the number of officers decreased it was necessary to abandon them because of the strenuous duties for the few remaining on duty. However, these meetings were of great value to the younger medical officers because of the presence on the station on temporary duty of some of the best medical men in the country awaiting transfer or disenrollment.

RECOMMENDATIONS.

Tentative requirements for an ideal receiving ship barracks.—Early in July, 1919, plans for a new receiving ship barracks, which had been drawn up in the Bureau of Yards and Docks, were submitted to the senior medical officer for recommendations as to the require-

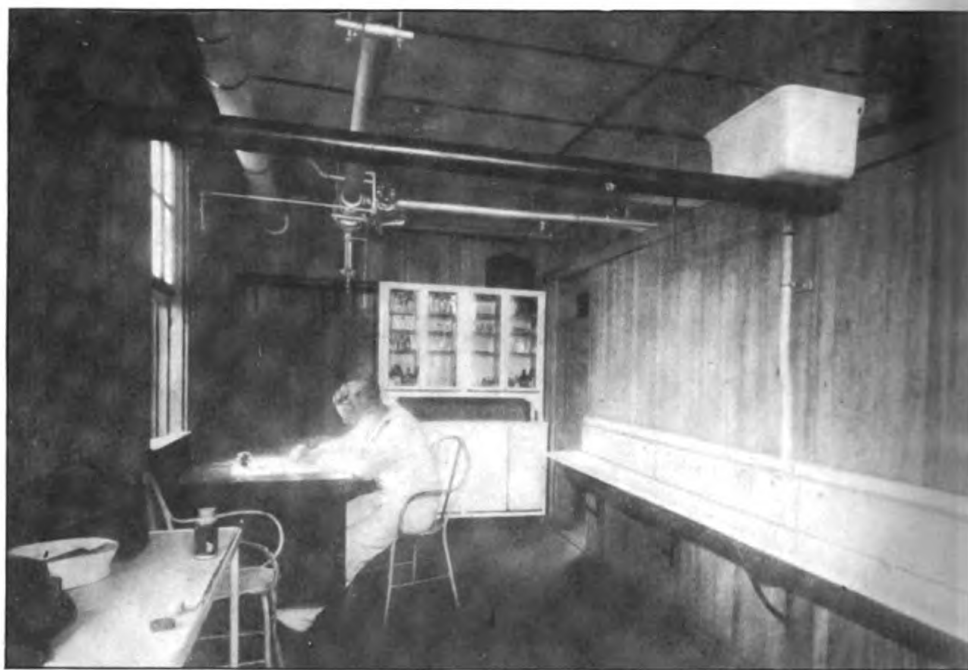


Receiving Ship Barracks, Bay Ridge, N. Y. Small ward in isolation building with its separate toilet (right). The Hospital Corpsman on duty observes what is going on from behind the glass window.



Receiving Ship Barracks, Bay Ridge, N. Y. Interior of typical large ward of the dispensary.

182-1



Receiving Ship Barracks, Bay Ridge, N. Y. Venereal treatment room in quarantine barracks
182-2

ments of the medical department. In view of the fact that the present location of this barracks is but a temporary one, it is thought that some of these recommendations, which are the result of nine months war and postwar experience at this receiving ship, may be of value when a permanent location is obtained.

The above plans called for a receiving ship barracks capable of housing 4,000 men for peace strength, and sufficient ground to erect another similar unit should hostilities occur. In view of the great importance of New York as a naval base, and the fact that there were at one time more than 13,000 men in these barracks (including this Island) during the late unpleasantness, it is not considered that barracks for 8,000 men would be sufficient if the fleet were to go on a basis again.

Dispensary.—Experience at this receiving ship barracks has shown many disadvantages in the multiple dispensary plan, viz, divided control of the sick, reduplication of sick reports and other data, difficulty in handling rations, and higher cost of maintenance. A single dispensary, with a capacity of 250 beds, having adequate surgical and medical equipment to treat ordinary cases, is considered necessary for receiving barracks of 4,000 men. The purpose in having a large dispensary is to eliminate as far as possible the transfer of men to naval hospital. By retaining patients at the receiving ship barracks for treatment, transfers of service records, pay accounts and other records would be obviated, patients would be seen from the beginning to the termination of an illness, and the time during which they were ineffective from sickness would be much shortened. In accordance to the suggested bed capacity, the original complement of beds in this receiving ship barracks was 108, but it was found necessary during the past winter to establish a total of 200 beds, which were kept constantly filled, besides transferring an average of 20 patients daily to the naval hospital.

It is considered essential that the above-described dispensary be equipped with ample laboratory facilities, isolation wards, an eye, ear, nose, and throat room, an X-ray apparatus, sick officers' quarters, and four dental chairs. A strong ward in proportion to the size of the detention barracks should also be included. It is needless to state that this dispensary should have a central location.

Sick-call rooms.—Going upon the assumption that the receiving ship barracks would be divided into four units or regiments of 1,000 men each, a small room should be allotted on the ground floor of a barracks in each regiment to be designated the sick-call room, and equipped as a first-aid station. In this room the men from each regiment would report at sick call for treatment, being seen by the regimental medical officer, who would send the men who were really ill to the dispensary. Men with only minor ailments would receive

treatment at the sick-call rooms and be immediately returned to their regiments, thus effecting a great saving in time.

Venereal prophylaxis buildings.—Small venereal prophylaxis buildings should be established close to each gate. These prophylaxis buildings would keep men returning from liberty after exposure from reporting to the dispensary for prophylaxis. Experience has shown that giving prophylaxis at dispensaries is inadvisable, as men report at all hours of the night, causing more or less disturbance and untidiness.

Detention barracks.—The detention barracks should have a large sick-call room, similar to the regimental sick-call rooms, but larger, where sick call for prisoners would be held, incoming and outgoing prisoners given physical examinations and finger prints made. Sick prisoners would be sent to the strong ward in the dispensary.

Disinfector.—It is considered essential that a disinfector be installed, preferably near the quarantine camp. A disinfector similar to the one in use at these barracks would be satisfactory; it would require a building with a concrete floor.

Examining rooms.—A draft and recruiting building, similar to building 105 on this receiving ship would be required for the examination of officers and men for discharge, release, and for recruiting. A separate room should be equipped for the physical examination of officers.

Small medical examining rooms would be required in both the incoming and outgoing draft buildings.

Incinerators.—Modern incinerators should be installed and located near each mess hall. With the proximity of the incinerators to the mess halls, the transportation and expense of hauling garbage would be eliminated, and sanitary conditions greatly improved.

Laundry.—It is considered extremely important that a laundry plant be constructed, of sufficient capacity for officers, chief petty officers, medical department and commissary department. It is considered that with the installation of a laundry great economy would be effected. The laundry bill for the medical department alone was \$800 for one month, owing to there being no laundry on the receiving ship.

(The photographs for the accompanying illustrations were taken by the enlisted personnel of the Navy Publicity Bureau.)

SANITARY ASPECTS OF THE GROUNDING OF THE U. S. S. "NORTHERN PACIFIC."

By J. C. RUDDOCK, Lieutenant, Medical Corps, United States Navy.

On January 1, 1919, at 2.20 a. m., the U. S. S. *Northern Pacific* ran aground on Fire Island beach on the return voyage to New York from France with 1,801 wounded and sick soldiers aboard, besides approximately 500 well soldiers.

Classification of wounded.

	Army.	Marines.
Number of litter cases.....	217	10
Number of ambulatory.....	1,520	50
Number of contagious.....	2	0
Number of dead.....	2	0

Order and discipline were maintained at all times in the hospital spaces where the stretcher cases were billeted, and any nervousness or irritability at first was soon quieted by the medical officers and hospital corpsmen. There was marked cheerfulness among the sick, and repartee, badinage, and laughter were quite prevalent among them. Most of them took it as a joke and just "in the day's work," and very few realized the serious aspect of the affair until after they had left the ship.

For the first three or four hours after grounding the engines were run full speed astern, and during this time the ship gradually took a list to port of about 20 degrees. Due to this backing, the condensers, the sanitary flushing system, and the water cooling systems for the dynamos were filled with sand. By morning this became serious in that all heads and latrines were in a filthy and insanitary condition, because they could not be flushed and were being used by 3,000 people on board. The toilets were all cleaned by flushing out with buckets of salt water and containers of salt water were placed in the heads for this purpose. This could not be done in all heads, so a number were locked and only certain ones designated for use. Bedpans and urinals from the hospital space were emptied directly over the side, and washed by lowering them into the water with a line; to avoid the necessity for doing so, no cathartics were given to anyone.

Due to the sand in the condensers, the drinking water question became paramount the day following the grounding, and there was not even enough water available to give enemas to the sick men in the sick bay. No water was served with meals, but coffee was made up and used as a substitute. This satisfied thirst and also acted as

a stimulant. This was only necessary for $2\frac{1}{2}$ days, when water was sent to us by the U. S. S. *Solace* in boat breakers. A condenser was rigged up in the engine room, and by boiling sea water in one of the ship's boilers and condensing the steam, enough water was made to furnish drinking water to all on board. This was kept up for the entire time the ship was on the beach, 18 days.

Due to sand in flushing systems, etc., no water was available for washing down, so the decks soon became covered with a layer of slush and dirt. This steadily became worse because of wrecking gear, baggage, and crowds of soldiers on deck. Every attempt to keep them clean with squilgees was made, but no systematic cleaning could be done because all available men were needed for salvage and rescue work. Our greatest danger was from fire, because of lack of water in our fire mains, and men were cautioned not to smoke below decks.

Fire extinguishers were kept in the galleys and a patrol was established for the entire ship to watch for fire. Due to trouble with the generators, immediately after the grounding, no lights could be had except those connected with the battle circuit. The next night, however, one of the generators was put in running order and all electric globes were taken away except a few standing lights in compartments. This condition lasted the entire time that the ship was on the beach. Another feature was the lack of electricity to run the blowers for the ventilators which made living conditions rather bad the second day, as a heavy sea was washing over the ship and necessitated closing all ports and hatches.

The ship is heated by the electric blowers, which when out of commission cut off all heat to the different compartments of the ship. All the crew were issued winter outfits, including windproof suits, boots, heavy underwear, mittens, and flannel shirts. The weather was very bad (i. e., drizzling rain and snow with a heavy sea pounding the ship from the southeast), until the second day, when the wind shifted to the north making a quiet lee between the ship and the beach.

On New Year's Eve, a special dinner was being prepared at the time of the grounding and this was served to all on board on New Year's Day. This consisted of roast turkey, mince pie, cranberry sauce, egg plant, fruit salad, and all the other accessories of a New Year's dinner. In order to conserve as much water as possible, everything served was either fried or roasted. Very little boiled food was prepared.

Although we had plenty of food, meats and fresh vegetables, etc., started to spoil after the second day, due to lack of refrigeration, so these were all brought up to the boat deck and hung up in the cold, biting wind. Extra stores were placed on lighters and sent to New

ark, where they were put in cold storage. Practically 30 per cent the food was spoiled and unfit for use, and almost one-half of the at had to be trimmed off before it could be used.

During New Year's Day no one was disembarked, although a line was run ashore, and by night a breeches buoy was rigged; but no was taken off on account of the heavy seas running. The next 253 well soldiers were put ashore by means of this life buoy. this time, January 2, 1919, a crowd of people had congregated on shore and about 18 or 20 ships were standing by to seaward, among which were the U. S. S. *Des Moines*, U. S. S. *Columbia*, U. S. S. *Mallory*, the U. S. Hospital Ship *Solace*, destroyers, and fishing tugs. Word was sent to all the ships to have motor boats alongside early the next morning, January 3, 1919, for disembarking wounded soldiers.

During this time all wounded had their dressings attended to by and in many cases several times daily.

In the morning of January 3 all cases were dressed before 7 a. m. medical officers on board and arrangements begun for disembarking. There were just six Stokes stretchers on board, so word was sent to the U. S. S. *Solace* and to the shore for more stretchers. This request was complied with and, besides 70 Stokes stretchers on the *Solace*, 25 were received from ashore.

The first man in a stretcher was put over the side about 10 a. m. This method was very unsatisfactory and very slow and required many men to handle the stretchers, so another method was used. Lifeboats were lowered on the lee side of the ship and secured from forward aft by means of lines and acted as floats, two being detailed to each boat. One davit for each boat was rigged and the stretchers lowered into the ship's lifeboats, from which they were taken away by motor boats. No stretchers, however, could be lowered unless boats were available to take them away. This was necessary in order to avoid any unnecessary exposure to the wounded men. They were lowered into lifeboats with gantlings. A medical officer superintended the disembarkation from the hospital ward and only sent cases to the boat deck when motor sailers were ready to receive them. This was necessary because of the rigidity of the weather. After each man was dressed he was wrapped in three blankets with a towel, cap or covering over his head, anything warm that was handy, and given a dose of whisky, and then strapped into a Stokes stretcher. He was then ready to go over the side.

Some delay was encountered from lack of Stokes stretchers, because after the first hundred were sent off the stretchers had to be brought back before other patients could be disembarked. No time

could be spent in an examination of all stretchers and some doubled up while being lowered over the side, much to the discomfort of the patient, although nothing serious resulted in the few cases in which this happened. All the mess attendants were utilized as stretcher bearers from the hospital space to the boat deck from which the stretchers were lowered.

It took the combined efforts of all on board for three days to disembark the wounded, and at 4 p. m. on the afternoon of January 5, 1919, the last wounded man left the ship.

Motor sailers were the boats of choice for handling the stretcher cases, because they could go alongside the hospital ship *Solace* more easily than the larger submarine chasers. This last type was used for wounded classed as walking cases.

The starboard gangway was rigged and the submarine chasers would come in, swing stern to bow, and the men would then walk or be helped down the gangway on board. This was a very difficult and slow process for men with arms or legs in splints, so another method was used which facilitated disembarkation very much.

Men were lowered directly to the deck by means of a gantling from starboard gangway davits. The walking cases or those not in stretchers were sent to the transport *Mallory* and to the destroyers lying by.

Everything possible was done for the comfort of these wounded men while on board. Their treatment was continued at all times as if nothing extraordinary was happening. The hospital corpsmen worked untiringly at all times, and the Navy should indeed be proud of the men who upheld its traditions in such a manner. The doctors' thoughts were for the safety and welfare of their patients, and it was with great relief and satisfaction over a big job well done that they saw the last wounded man safe on board the U. S. S. *Solace* without a single accident.

RELATIONS OF MEDICAL CORPS TO MEDICAL RESERVE CORPS: IMPRESSIONS OF A RESERVIST.

By L. R. G. CRANDON, Commander, Medical Corps, United States Naval Reserve Force.

Experience on active naval duty in war time has been a revelation to the reserve officer.

An admiral of the line once said to the writer: "When you enter the Navy, much more than you can believe depends upon your first associates amongst the senior officers. The deck nearly always has a slant and the officers just above you either start you upward or downward and so you are likely to continue." In the medical corps the push seemed to be always upward.

Some reservists expected to find the medical corps sharply military, extremely punctilious as to rank and precedence, perhaps not making the reserve officer altogether welcome. In short, we may have believed the medical corps to consist more of naval officers than of doctors. The reverse has been the truth. Rank and precedence, outside of military or disciplinary need, were forgotten in all things clinical. We were all doctors, each with a right to be heard and weighed in proportion to his experience.

The examinations for enrollment were searching, complete, fully up to the standard of the best medical schools. They were conducted with promptness, dignity and precision. Occasionally an examining officer "barked" and was discourteous in order to "spring rank," but he was always the junior man and would have had the same manners if not in the Navy. The physical examination was thorough; the stress of war showed no effect in haste or lowering of requirements. This high standard is in part, no doubt, the reason that the medical corps has never been full to its authorized strength.

"Paper work" and the written relations of the newly enrolled officer to the department was a revelation to the average civilian doctor. He learned to write letters in military form (which should be universally adopted in commercial life); he learned to write with exactness, to mean precisely what he wrote, and to waste no words. Health records and surveys were official documents with far-reaching matters of recompense and justice hanging on them. Written facts and opinions, sharply separated, must show their personal source, not only, but also must go through official channels and thus carry out the real unity of the great organization. All this educated the new officer in an entirely new line and must reflect on his whole future in civil practice.

It shortly became apparent to the discerning reservist that the medical department was successfully following its plan of organization, namely, at the call for expansion to put the regular officers on the military and executive work and to have the clinical work done largely by the reservists.

Better care men could not get than was given patients in the Navy in all respects—technical skill, quality of food, and kindly interest. No expense was spared for food, medicines, sera, vaccines, apparatus, and instruments. Officers and hospital corpsmen followed their work day and night, and, during the influenza pandemic, the sick received attention that \$1,000 a week outside could not buy. Every letter, telegram, or inquiry from friends of patients received prompt and explicit reply. Relatives who came to the dangerously ill had free access, received every courtesy, in many instances were given quarters. No hint that political influence had a bearing ever came to the writer's notice. That the dead were well cared for is shown by

letters of thanks received by the writer from all over the country. There were several instances of public funerals held over 1,000 miles from the place of death.

These impressions are critical, not laudatory. There were frequent clashes of opinion but not of wills. The writer was constantly fearful that a junior officer might be ordered to do some operation or give some treatment which he considered improper. To carry out such an order would seem to the reservist to nullify his professional honor. It may be that some paragraph of "I and R" covers his conduct in such an instance; if not, there is certainly material for court proceedings when two officers of strong convictions disagree on treatment.

Clinically, with always a large number of medical minds to review a given case, few mistakes could "get by." The "furor operativus" in certain officers has to be checked, but it is no worse than in civil practice, except that the patient does not feel quite the same freedom to refuse treatment in the service that he may as a civilian. The only frequent clinical error was a tendency to lay rheumatism to a disease arising from the patient's misconduct rather than to the tonsils and teeth, so constantly guilty. More general X-ray instruction to officers is sadly needed. The most skillful and better clinical officers in some way should be relieved of paper and executive work and assume the status of civilian consulting surgeons.

It may be seen that grounds for adverse criticism are hard to find. It is quite apparent that the department was ready for the recent emergency, rose to it, and made good. The reservist congratulates the regular.



VOL. XIV

NO. 2

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DEPARTMENT OF THE SERVICE

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CAPTAIN J. S. TAYLOR, MEDICAL CORPS, U. S. NAVY
IN CHARGE

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Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

NOTE.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

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TABLE OF CONTENTS.

	Page.
PREFACE	v
NOTICE TO SERVICE CONTRIBUTORS	vi
SPECIAL ARTICLES:	
TYPES OF NEUROLOGICAL AND PSYCHIATRIC CASES.	
By Lieutenant Commander E. C. Taylor, Medical Corps, U. S. N.	
R. F.	191
YELLOW FEVER.	
By Lieutenant Commander T. Wilson, Medical Corps, U. S. N.	200
ASEPSIS OF ABDOMINAL INCISIONS.	
By Lieutenant Commander F. H. Bowman, Medical Corps,	
U. S. N.	208
CALCIUM CHLORIDE INTRAVENOUSLY FOR HEMOPTYSIS.	
By Lieutenant Commander W. H. Fickel, Medical Corps, U. S. N.	210
HOSPITAL RECORDS	213
HISTORICAL:	
THE ARABIANS AND THE FIRST REVIVAL OF LEARNING	225
SUGGESTED DEVICES:	
HOSPITAL GARBAGE DISPOSAL.	
By Captain A. Farenholt, Medical Corps, U. S. N.	237
THE FLAT-FOOT LADDER	240
CLINICAL NOTES:	
CHONDRODYSPLASIA WITH EXOSTOSES.	
By Lieutenant R. W. Hutchinson, Medical Corps, U. S. N.	243
A CASE OF VASCULAR SYPHILIS.	
By Lieutenant A. E. Kuhlmann, Medical Corps, U. S. N., and	
Lieutenant Commander C. C. Ammerman, Medical Corps, U. S. N.	
R. F.	245
TWO CASES OF ENCEPHALITIS LETHARGICA.	
By Lieutenant Commander R. I. Longabaugh, Medical Corps,	
U. S. N.	249
A CASE OF FOREIGN BODY IN THE HEAD.	
By Lieutenant Commander L. M. Schmidt, Medical Corps, U. S. N.	254
THE LATE TREATMENT OF WAR OSTEOMYELITIS.	
By Lieutenant E. I. Salisbury, Medical Corps, U. S. N. R. F.	255
TWO CASES OF GAS GANGRENE.	
By Lieutenant Commander L. M. Schmidt, Medical Corps, U. S. N.	257
GASTRIC ULCER WITH PERFORATION.	
By Lieutenant G. G. Holladay, Medical Corps, U. S. N. R. F.	259
INTERNAL OPHTHALMOPLÉGIA.	
By Lieutenant Commander E. E. Woodland, Medical Corps, U. S. N.	260
OPEN TREATMENT OF A FRACTURED METACARPAL BONE.	
By Lieutenant R. W. Auerbach, Medical Corps, U. S. N.	263
SUPERNUMERARY PHALANX.	
By Lieutenant R. S. Reeves, Medical Corps, U. S. N. R. F.	265

CLINICAL NOTES—Continued.

A CASE OF RUPTURED KIDNEY.

By Commander R. R. Richardson, Medical Corps, U. S. N.-----

MUSTARD GAS AND THE CARDIOVASCULAR SYSTEM.

By Lieutenant Commander W. H. Michael, Medical Corps, U. S. N.-----

A CASE OF ULCER OF THE SIGMOID FLEXURE.

By Lieutenant H. R. Coleman, Medical Corps, U. S. N.-----

A CASE OF MALPOSITION.

By Lieutenant A. C. Tollinger, Dental Corps, U. S. N.-----

PROGRESS IN MEDICAL SCIENCES:

GENERAL MEDICINE—Blood pressure and posture—Intramuscular injections of quinine in malaria—Vincent's disease-----

SURGERY—Appendicitis amongst sailors—Transplanting of bone—Rectal ether anesthesia-----

HYGIENE AND SANITATION—Destruction of lice by steam-----

EYE, EAR, NOSE, AND THROAT—Ocular phenomena in the psychoneuroses of warfare—Ocular complications due to typhoid inoculations-----

NOTES AND COMMENTS:

Syphilis and the war—Bone surgery—National Research Council—Laboratories in Poland—National Anaesthesia Research Society—Vanderbilt Medical School—Municipal education in Detroit—Female medical matriculates—Degrees conferred by Royal College of Surgeons of Edinburgh—Speech defects—Typhoid fever in New York—Venereal diseases in California—Omissions in the Annual Report of the Surgeon General, 1919-----

REPORTS:

U. S. NAVY AMBULANCE BOAT No. 1.

By Chief Pharmacist's Mate D. V. De Witt, U. S. N.-----

PHYSICAL DEVELOPMENT IN THE NAVY.

By Lieutenant B. G. Baker, Medical Corps, U. S. N.-----

VENEREAL PROPHYLAXIS AT GREAT LAKES, ILL.

By Lieutenants D. R. Blender and L. A. Burrows, Medical Corps, U. S. N. R. F.-----

REPORT OF 505 TONSILLECTOMIES.

By Lieutenant W. P. Vail, Medical Corps, U. S. N. R. F.-----

BOOK NOTICES-----

PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

W. C. BRAISTED,
Surgeon General, United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterhead, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All material supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

VOL. XIV.

APRIL, 1920.

No. 2

SPECIAL ARTICLES.

TYPES OF NEUROLOGICAL AND PSYCHIATRIC CASES COMMON IN THE NAVY.¹

By E. C. TAYLOR, Lieutenant Commander, Medical Corps, United States Naval Reserve Force.

In December, 1918, our sick and wounded returning from the different ports in Europe reached such numbers that the naval hospital at New York assumed unprecedented activity.

Mental and neurological patients formerly treated in different departments were grouped together into a separate service which grew rapidly until a maximum of 112 patients was reached. In the first quarter of 1919 the daily average was usually over 90 patients.

The writer took charge of this service late in December, 1918. Fairly complete records have been kept and it is believed that the Navy medical corps will be benefited by a brief review of eight months' work in this department.

The diagnosis of nervous and mental diseases is often difficult because the complete development of a psychosis is rarely seen by one medical officer. One phase under observation for a few days may give a wrong impression, although well-marked types offer less chance for error.

The table shows that most of our cases fall within a few well-defined groups. The proportion between sailors and marines is fairly constant. The neuroses are high among the marines on account of those returning from the war zone. Dementia præcox and constitutional inferiority cases are high among the seamen branches due to abolishing the preliminary period of observation at the training stations, where many of these defectives were formerly detected and eliminated.

The ward records, classified according to our Navy nomenclature give some interesting information regarding the number of patients, the proportion and variety of different diseases, and the ultimate disposition of the 651 cases covered by this report.

¹ The period covered by this review is from Dec. 20, 1918, to Sept. 23, 1919.

	Number of patients.	Under treat- ment.	To civil life.	To duty.	To other wards.	To Wash- ington, D. C.
Constitutional inferiority.....	70	3	49	7	11	
Constitutional psychopathic state.....	21	1	13	5	1	1
Dementia paralytica.....	6					6
Dementia praecox.....	65	4	8			53
Melancholia, involutional.....	2			2		
Paranoia.....	3		2			1
Psychasthenia.....	30	5	16	6	3	
Psychoneurosis.....						
Neurasthenia.....	113	5	57	39	12	
Neurosis, war.....						
Psychosis, exhaustive, infective, toxic.....	5	2		2	1	
Psychosis, intoxication.....	10		2	7	1	
Psychosis, manic depressive.....	23	1	1			21
Psychosis, senile.....	3			1		2
Psychosis, traumatic.....	17		10	3	2	2
Psychosis, unclassified.....	1	1				
Neuritis.....	18	2	13	2	1	
Paralysis of nerve.....	25	2	15	6	2	
Stammering.....	3		3			
Aphasia.....	2		2			
Chorea.....	3		2		1	
Epilepsy.....	71	1	60	9		1
Hysteria.....	51	3	26	11	11	
Locomotor ataxia.....	2		1	1		
Syphilis.....	35	1	1	8	21	4
Undetermined to no disease.....	12			12		
Diseases not neurological, diagnoses changed.....	31				31	
Other diseases, nervous or mental.....	29	4	25			
Total.....	651	35	306	121	98	91

"Other diseases" of nervous or mental origin includes those of which we received one or two cases each as somnambulism, multiple sclerosis, Menière's disease, atrophy of the muscles, embolism, hemiplegia, transverse myelitis, and syringo-myelia.

CONSTITUTIONAL INFERIORITY.

This group accounts for 11 per cent of the total number of patients on this service.

During the war many of these defectives were keyed up to their best. Peace time, barrack life, and receiving-ship routine brought about a reaction which quickly sent these undesirables to the sick bay. Since the spring of 1918 the recent recruit has been most in evidence. His deficiencies are usually first noted by some chief or division officer whose observations and opinion are often of great value in cases that do not show much intelligence defect.

It is no wonder that the parents bring such a boy to the recruiting officer hoping that the Navy will "make a man out of him." The time spent in his training is an economic loss to the service, although the boy is often benefited.

Some years ago the methods of examining recruits for mental defects were reviewed by Assistant Surgeon A. R. Schier, United States Navy, and others in the BULLETIN. The writer has used these suggestions extensively in recruiting duty with good results. It is difficult to understand, however, how a boy can complete the eighth grade of common school and yet be so deficient in judgment as to be

almost a menace aboard ship. He can be eliminated only by trial and observation.

DEMENTIA PARALYTICA.

There were but few of these cases but with them should be considered the specific cord lesions and the larger group under the diagnosis of syphilis which will be considered later.

The insidious onset of dementia paralytica often causes distressing predicaments, both official and personal, until some overt act leads to admission on the sick list and a subsequent diagnosis. During the transition from normal to a state of dementia these cases must be under constant surveillance as they are a menace to themselves and others. With untiring energy and zeal they attempt to carry out the most preposterous schemes and often fly into a rage if there is the slightest opposition to their desires. These cases are not always the happy expansive romancers that textbooks and show clinics lead us to expect.

DEMENTIA PRÆCOX.

These patients make up about 9 per cent of our total and constitute one of the large classes of the real insane found in the Navy. Most of them are recent enlistments. If in the service for any length of time their records show many minor offenses, deck courts, poor efficiency marks and sometimes a prison term. Their peculiarities gradually increase until symptoms are sufficiently developed to be recognized or until their division officer grows weary of their inaptitude and sends them to the medical officer for observation.

A few who had been in the Navy but a short time gave histories of former mental disturbances. One patient insisted on having liberty on a certain date, as he was required to report every 30 days at a well-known State institution and he did not wish to lose his parole privileges! Another told of having just escaped from an institution. These two patients hold the record for a short cruise. The latter escaped from an institution in Pennsylvania one day, enlisted in the Navy the next day, spent the third day on the receiving ship, his fourth day on a battleship, and his fifth day in our ward for observation as to his mental condition. His symptoms were those of early dementia præcox, but he claimed that he had been struck by lightning.

Very early cases of this class should, I believe, be returned to their home or former environment and under the direct supervision of their family continue their efforts at self-support for as long a period as practicable. Once institutionalized beyond the habit of obeying orders and looking after their own personal cleanliness, their usefulness at production is very limited and decreases with age.

NEURASTHENIA.

When this record was started the groups of psychoneurosis and neurosis, war, had not been added to the nomenclature. Large numbers of these two conditions were included in the table as neurasthenias, so we continued this grouping in this article. Undetected malingerers, arrested or not fully developed psychoses, and many of the so-called shell-shocked marines are in this class.

Our idea of a typical neurasthenic is as follows: He complains of numerous aches, pains, and abnormal sensations. He is easily influenced by suggestion. He sometimes adopts a set of symptoms belonging to a man in the next bed only to change them in a few days when some new and more striking symptom is brought to his attention by accident or design. In well-marked neurasthenia the characteristic which seems to be present always is early fatigue following any effort either mental or physical. In modern motor language, the battery is low or the spark is weak. The so-called shell-shocked cases have received much publicity but there is another group equally interesting. The engineering forces of the destroyers, mine layers, and other small vessels contributed their share to our ward. These men stood long watches; their sleep was broken; their chance of escape in case of action or accident was small. They developed a neurosis all their own.

They usually showed muscular tremors, increased reflexes, and considerable anemia. They complained of weakness, insomnia, and digestive disturbances. It was our habit to inquire of these men about family troubles, sickness at home, financial or other difficulties, and to make some definite statement regarding communication with their families or the granting of leave. A good bed, a quiet room, the assurance that there was nothing for them to do but to get well, seemed the best remedy for them. Some of them would sleep for two or three days, waking only for meals and a short walk. After this period of complete rest and relaxation, recovery was rapid and usually complete.

Another type of neurasthenic found during this period was the man who entered the service early in the war and was given an advanced rating because of some special ability in civil life. The rapid growth of the Navy gave this man rate or rank beyond his attainments. Repeated failures destroyed his nerve, the hospital was a haven, while the sight of a duty list caused sudden relapses.

The regular service man under similar conditions would usually be willing to do his best and some requested a reduction in rating for fear the responsibility of the larger job would be too much for them.

PSYCHOSIS, EXHAUSTIVE.

This small group might be passed over if it were not for the impressions these three patients made. In two of them the symptoms existed as complications of severe cardiac disturbances and in the third psychosis followed an intestinal condition.

Without the history and if examined when their hallucinations and delusions were most active, all three patients would have been classed as dementia præcox. Two exhibited negativism. All three recovered. The hallucinations disappeared first, then the delusions, then followed a period of confusion during which the patient was evidently trying to adjust himself. They showed early insight and recovery was rapid and complete. For a time during convalescence they appeared like children and placed excessive reliance on the opinion of the nurse or ward officer for the most minute details of their conduct.

PSYCHOSIS, MANIC DEPRESSIVE.

There were 23 well-marked cases of this disease, all of whom were sent to Washington except one.

As every medical officer knows, these are bad and nerve-trying cases to handle aboard ship. When seen at their worst they showed marked psychomotor activity, reacting to the most unbearable hallucinations and delusions and attempting to destroy everything within reach—even making repeated attempts on their own lives. However, one fact must be kept in mind. These patients belong to a type where recovery is common, sometimes complete, and in many instances with long periods of productive and useful life before a recurrent attack.

PSYCHOSIS, TRAUMATIC.

There were 17 patients whose mental symptoms could be directly traced to an injury. Some of them were slight and ended in recovery. Most of them were of a severe nature and these were ultimately surveyed out of the service or to Washington. Two of them had been in explosions. The remainder had suffered direct injury to the head. Four had been operated on before reaching this service, and X-rays were of little help.

The mental symptoms were difficult to classify. Three or four developed epilepsy while in the ward; but localizing symptoms were lacking and operative measures were not advised by the other departments consulted. Most of them complained of headache at intervals while two had intense headache almost constantly.

All of the most serious cases showed a memory defect for recent events and some a persistent mental confusion. Not one became

irritable, cross, or difficult to handle; but most of them were pleasant, hopeful, and willing to cooperate in any work. All but three or four had insight to some extent and their greatest worry was lest they should be a burden to their families.

Some of them were tried out on different kinds of work with uniform failure. Their work was inaccurate, incomplete, and poorly done. They showed early mental fatigue or increasing confusion. Simple physical labor under constant supervision seemed to be their limit.

Summing up the findings in this group, our short period of observation shows that most of them resemble a simple dementia and the remainder become epileptics.

NEURITIS.

On this subject we wish we could add something to the existing literature in the line of treatment but we are unable to do so. Most of our cases were obstinate and many of them were followed by paralysis in the part supplied by the affected nerve.

PARALYSIS OF NERVE.

Our studies of about 25 cases were very instructive. For instance, in the ward at one time were five cases of paralysis of the facial nerve each due to a different cause, as far as could be determined, as follows: Direct prolonged exposure to cold in an open boat; otitis media; traumatism due to direct injury of the mastoid by falling through a hatch; syphilis, as no other cause could be found except four plus Wassermann and the case improved under treatment; extreme heat when, as fireman, he cleaned several fires, with the left side of his face to the fire, following which he stood for some time before a blower, resulting in a left facial paralysis within three days.

There were several cases of wrist drop, the most unusual of which was found in a radio operator who had been on long watches alone when for several days there were many messages demanding almost constant work. We believe this was a true occupational condition, as no other cause could be found.

Convalescent meningitis patients were always present in some stage of recovery.

Two or three post-diphtheritic cases demonstrated something unusual or new to the writer, whose experience in that particular class of patients has been limited. One of these men had a pharyngeal paralysis which recovered in about one month from the onset of the diphtheria. He then complained of weakness in the hands so that a hospital corpsman's help was required in dressing. The following day while walking down the ward he fell and was unable to rise. He

was placed in his bed where he remained nearly a month with only sufficient power to move his arms and legs, but the pharyngeal condition continued to improve. Recovery was slow and he was surveyed and sent home after he had been up and about for one month. At the time of discharge he could walk well on the level, but up-grades and stairs required more energy than he could command without intervals of rest. Two other cases of post-diphtheritic paralysis were similar but not so extensive or severe.

Our observation of these cases of paralysis of the nerve seems to show that following an injury the nerve is inactive for a long time; that recovery once started is fairly rapid up to a certain point; that although function is restored, muscle power or nerve stimuli never quite reach their former normal. Thus a facial paralysis may recover in a month so as to be unnoticed when the face is in repose. Any of the usual muscle tests, such as smiling or laughing, shows the loss of power at once. A case examined in another ward gave a history of having injured the right brachial plexus seven years before in a railroad accident, resulting in a paralysis. After several months of slow recovery the arm apparently became normal except in power. Recent examination shows this arm to have almost exactly the same measurements as the left and be capable of performing the same movements. Muscle tests, however, show that the right arm is only a little more than half as powerful as the left, seven years after the nerve injury.

APHASIA.

Of this peculiar disorder we had several cases most of whom were ultimately classed as hysteria because of plainly evident associated symptoms.

One patient's history was as follows: He was shipwrecked in France, treated in a hospital for pneumonia, surveyed to the United States, and arrived in New York during the harbor strike, these incidents occupying nearly three months' time. In New York he was detailed as deck hand on a tug. While standing in the bight of a line, the tug lurched, the line became taut and the patient was thrown so suddenly that he struck the back of his head on the deck. He was unconscious two days, following which recovery was rapid. On admission here he complained of headache and a slight blurring of vision but no other symptoms. His memory was a blank for the long period extending from his shipwreck in France to the time he regained consciousness from his head injury in New York. He did not know the ship which brought him home, could not remember the ports visited or any incident of the voyage. His story was pieced together by visiting shipmates and by consulting the entries in his health record since his attack of pneumonia. His memory for the

above period did not return while a patient here although in other things his mind seemed normal.

The second case is even more remarkable. A sailor was picked up on one of the roads which cross the New Jersey meadows west of Weehawken. Examination at the station convinced the officer that he was not intoxicated and he was taken to the hospital. He was sent to us the next day and remained in a state of coma for two days. There was no evidence of intracranial injury. He was up and about the ward on the third day but did not talk. When a question was asked he smiled but could not answer. About the fifth day he began to talk but he could give us no account of himself. There were two initials on his clothes and numerous marks about his person. These marks with his finger prints soon established his identity through assistance obtained from Washington. We found his ship, collected his records, and communicated with his family. He was supposed to be on 10 days' leave and his family was looking for him but no word came until our letter.

Many examinations were made of this patient and one of the most interesting things brought out was that he could figure difficult problems in arithmetic but knew nothing of history or geography. A list of peoples' names, including his own, was given him and he was asked to point out names which he had seen or knew. He never once picked his own name. When given a pen and asked to write his name he would go through all the preparatory motions but stop and look distressed when the pen touched the paper. He was reeducated as well as our time would permit, given liberty in company with friends, and finally transferred to his home city with a large draft of patients.

Arrangements had been made for him to meet his family at the station in the presence of a hospital corpsman. He was at once discovered by his mother, who claimed him, but the patient did not remember his family. Later, through unofficial investigation by a nurse formerly in the service who lived near this patient's family, we learned that he had formerly gone through a similar experience and rumor said that he inherited the tendency from his mother. We hope his second recovery has occurred before this.

EPILEPSY.

These cases form the largest single group and have the shortest term of service. The number of epileptics enlisted is very high notwithstanding the fact that this is one of the causes for rejection of an applicant. The intense desire of this class of applicants to enter the Navy has long been a puzzle. Inquiries at the recruiting offices, histories as given by patients, and investigations of modern industrial

conditions have helped to explain why we have so many epileptics in the service.

For several years law-making bodies have widened the scope of the different working men's compensation acts, so that no employer will risk hiring a man who is liable to injure himself, or a fellow-worker, or cause extensive damage to property. The epileptic is usually lacking in education and often shows a beginning mental deterioration. After leaving school he obtains a position in a store or factory, on a delivery wagon, or even for driving a car. Sooner or later he has a convulsion, frequently with bad results. He is immediately discharged as no employer can afford to pay for his actual or potential damages. He goes from job to job holding them only between seizures, if he is subject to grand mal, until as a last resort and often with the advice of his family, he enlists in the Navy.

Epileptics with a distinct aura may escape detection by seclusion. Those having nocturnal or infrequent attacks may go unnoticed for a long time. The nocturnal epileptic often falls from his hammock and afterwards gives the fall and injury as a cause for his fits. Visitors or members of the family sometimes give sufficient history to establish the origin as existing prior to enlistment in these cases.

At this point the writer wishes to make a suggestion regarding the notes in the health records on these cases. It is not desirable to hold a patient a long time waiting for him to have a fit. He can not be surveyed without sufficient evidence. If returned to duty, he is likely to come back by return ambulance. We often receive records with entries as follows: "Patient or patient's friends reported that he had a fit while on liberty." "Patient reported that he had a fainting spell after coming off watch." "The patient was seen by a hospital corpsman who reports that patient was found unconscious." Such notes are not sufficient evidence for a survey board. The patient may have fainted, been intoxicated, have had other sickness, or may have been overcome by excessive heat.

We would like to see entries written somewhat as follows: "This patient was seen by a medical officer while patient was having a typical epileptic seizure during which there were convulsive movements of the body, loss of consciousness, biting of the tongue, frothing at the mouth, dilated pupils which did not react to light. Conjunctival reflex absent. The attack was followed by a period of sleep, unconsciousness or mental confusion. The patient later gave a history of previous attacks and described an aura. There is no history of a recent cranial injury."

Not all cases show such complete symptoms but as many may be described as are noted. A health record written as above would allow a patient to be placed before a survey board with sufficient

evidence for his immediate disposition without a long period of observation at a hospital.¹

SYPHILIS.

Thirty-five patients received with "diagnosis undetermined" or diagnosed as some other disease were found later to be cases of syphilis. All of these had a three or a four plus Wassermann on repeated tests, and most of them gave a history of a primary sore less than four years before admission, followed by insufficient treatment.

Their symptoms varied from those of slight nerve paralysis to those of a more severe involvement like hemiplegia and tabes dorsalis. Several of them had acute hallucinations, loss of memory, and mental confusion. Under treatment several of them cleared up in such a remarkable way as to leave no doubt about the successful result of modern curative methods in early syphilis of the nervous system.

Some of these patients were returned to duty apparently well. We wonder about their future. Will the hemiplegia which cleared up so quickly under treatment eventually terminate as such? Will the cases which so closely resembled paresis stay cured or terminate as paresis? The available literature is very indefinite on the subject.

The peak of this work has long since been passed, but we will always have some of the mentally defective with us. We hope this paper will create a greater interest in this group of patients. Their number is small when compared with those suffering from other diseases, but their importance is made clear when the following two facts are considered: Almost 50 per cent of them are unfit for the service and are surveyed to civil life. Nearly 15 per cent are mentally incompetent and are sent to Washington, D. C., for further study and disposition.

YELLOW FEVER.

By T. WILSON, Lieutenant Commander, Medical Corps, United States Navy.

On August 25, 1919, Dr. Breccio, the surgeon general of the Honduran Army, stationed at Amapala, requested the medical

¹ From the point of view of the hospital staff so complete a report as the one outlined would be most desirable and obviate a long period of observation at the hospital. Unfortunately to obtain such data a long period of observation on board ship would often be necessary and the cruising vessel, with its open hatches, machinery, many ladders etc. is not a safe place for an epileptic. A man even suspected of epilepsy must be transferred promptly to some place where observation can be carried out with safety to the patient. The hospital with its superior facilities must remain the court of ultimate appeal whenever the diagnosis is in doubt. (Editor.)

officer of the U. S. S. *Chicago* to join him in consultation with other doctors of that port with regard to a sick boy confined in the Amapala Hotel. Two of us diagnosed the case as yellow fever, the others not concurring in this diagnosis divided the conclusions of the doctors at the consultation most unsatisfactorily. Liberty for the officers and crews of the United States war vessels lying in the port was immediately stopped as a precautionary measure. The sick boy died three days later with typical symptoms of severe yellow fever. The disease spread rapidly among the natives ashore, and within 10 days 12 cases had been observed with 4 deaths. The source of infection of the two cases occurring among the crew of the U. S. S. *Chicago* was traced to the city of Amapala and not to mosquitoes aboard ship. Both of our cases recovered without further dissemination among the ship's personnel.

The health authorities ashore were inadequately equipped with funds and knowledge to cope with such a disease as yellow fever. The city of Amapala was in a bad sanitary state and abounded in fever-carrying mosquitoes. One practitioner was exiled from the country during the early days of the epidemic, leaving two native doctors to care for the normal sickness and the epidemic among some 3,000 inhabitants of Tigre Island.

The assistance of the medical department of the *Chicago* became imperative, and was liberally given throughout the rest of the ship's stay in port.

We drew up accurate maps of the city of Amapala pointing out the danger zones and gangs of men were put to work lowering the stegomyia index by destroying mosquito breeding places and liberally using petroleum. The work was slow, due to the lack of funds from the Honduran Government and the ignorance of the native population. In the emergency we prevailed on the foreigners (American and French) to repair and equip under our direction an isolation hospital in the suburbs of the city. We later requested the Rockefeller Commission, then in San Salvador, to come to Amapala and take charge of the work ashore, as the precarious political situation restricted us from giving our full attention to the epidemic, Honduras then being in a state of revolution.

The International Health Board of the Rockefeller Foundation, headed by Col. Theodore C. Lyster, Medical Corps, U. S. Army (retired), a member of the yellow fever commission, arrived aboard the *Chicago* August 31, and established their laboratory in the dental office on the after bridge. Dr. Charles F. Bailey, director for Salvador, Dr. Wenceslao Pareja, of Guayaquil, Ecuador, who worked at Guayaquil with Dr. Noguchi, and others composed the board of workers. These men were equipped in every way to cope

with the situation, having knowledge, funds, reputation, laboratory outfit, including guinea pigs, and a supply of Noguchi's vaccine and serum made at the Rockefeller Institute under the direction of Noguchi.

The following observations take into consideration the latest work done by Noguchi, some of the conclusions of the commission working in Central America and our own experience with the epidemic occurring at Amapala, Honduras. No attempt will be made to follow the textbook details of clinical cases except to emphasize certain points offered by recent workers with the disease.

Geographical foci of to-day.—Guayaquil, Ecuador, appears to be the most important focus of yellow fever on the earth's surface, but due to the late work undertaken there, during which period Noguchi described the *Leptospira icteroides*, this locality has become almost free from yellow fever. The strict quarantine regulations and systematic sanitary procedures at the Canal Zone keep the Guayaquil focus from contaminating the Central American Republics to the north, but as yellow fever appears above the zone sporadically this fact has made students of the situation look northward for another focus. The Gulf of Fonseca harbors a very high percentage of *Aedes Calopus*. *Stegomyia* estimations in this region have run as high a percentage as 85. Yellow fever is constantly looked for and quickly checked whenever and wherever it crops out in the lowlands of the gulf. A good many observers attribute the sporadic appearance of yellow fever in the Central American Republics to an inaccessible focus in lower Mexico. The Rockefeller Commission is unable to invade Mexico at this point due to the hostile attitude of the Mexican people toward the citizens of the United States, and until this focus can be eradicated by the systematic methods of the commission there will always remain this menace to the *Stegomyia*-infested areas of Central America. Medical officers of American men-o-war visiting Central American ports should always keep in mind the danger to the crews of their ships from yellow fever. To-day there exist no other known foci in the Western Hemisphere.

Etiology and morphology.—Formerly it has been usual to describe the cause of yellow fever as simply a filterable virus, but Noguchi has gone further by describing the *Leptospira icteroides*, passing the organism through Berkefeld filters (V and N), inoculating healthy guinea pigs with the filtrate, thereby producing typical symptoms of yellow fever in the animals, then observing the organisms in the blood of the animals thus inoculated. Among his experiments to prove the specificity of the described organism was Pfeiffer's phenomenon in which bacteriolysis was observed. The disease has been transmitted from man to animal and from animal to animal by the *Aedes Calopus* as intermediary. During the infective period of the dis-

case, the uncovered hands and forearms of yellow fever patients were thrust within a mosquito cage containing numbers of noninfected female *Aedes Calopus* and the mosquitoes allowed to feed. The infected mosquitoes were held through a 14-day incubation period, and at the end of this time guinea pigs with abdomen shaved and feet immobilized were introduced into the cage and fed upon by the infected mosquitoes. Noguchi wished to observe the daily clinical symptoms of the disease in the pigs and so charted very carefully the thermal findings, examined the blood and urine, and paid special attention to albuminuria, which simulated the increase and disappearance observed in the human being. Some of the pigs recovering spontaneously were subsequently inoculated with either a pure culture of *Leptospira icteroides* or a visceral emulsion and were found to be immune. Generally, after two or three days, the pigs developed fever ending fatally with typical lesions of yellow fever revealed at necropsy. The same organism and similar lesions were constant. Not only in guinea pigs were the lesions reproduced, but in dogs, and in monkeys brought from Panama, since the indigenous monkeys of Ecuador showed resistance. So marked were the lesions in the guinea pigs that after a human necropsy it was customary to compare the human with the experimental animal pathological processes, which were found to be identical.

Until Noguchi's work at Guayaquil, previous bacteriological investigations into the causative agent of yellow fever had failed, which speaks for its not being of bacterial origin. Some of the older investigators suggested a spirillum or protozoa similar to trypanosomes or treponemata, but Noguchi thinks that, due to its combination of bacteriological and protozoal properties, it should be classed as an intermediate type.

The organism can not be defined by translucent light, but becomes visible under intense ultra light and appears as a chain of luminous points, actively motile, undergoing vibration, rotation, bipolar progression, and sometimes appears to have marked flexibility to almost any angle in a semisolid medium. A distinct terminal motor portion compares with flagella and with terminal filaments of spirochete or treponema. In isotonic solutions of sheep and mule serum, the organisms can be cultured, but their culturing is not as easy as for other organisms of that class and needs special culture media. Stained specimens prepared by fixation with osmic acid and the use of one of the Romanowsky combinations are recognizable, but lose the attractiveness of the organism as seen under dark field illumination.

Leptospira biflexa, *Leptospira hebdomadis*, and *Leptospira icterohemorrhagica* have been described previous to Noguchi's work at Guayaquil. His well known experimentations with *Leptospira icterohemorrhagica*, and the similarity of certain symptoms of the

disease caused by the organism to those of yellow fever, was the incentive which led to the discovery of *Leptospira icteroides*.

The organism falls in the general order of spirochetæ, but in a sense is neither a bacterium, spirocheta, spironema, nor treponema, but belongs to the genus *Leptospira*.

Until a simplified method of blood examination is found, there will always remain the difficulty of early positive diagnosis of yellow fever due to the inaccessibility of electricity with which to operate the dark field illuminator in the backward localities of high *Stegomyia* index. Direct and immediate examination or some serum phenomena should soon be available. The main reason for establishing the laboratory of the Rockefeller Commission aboard the *Chicago* was the fact that we possessed the only available source of electricity in that locality.

The rough albumen estimates recorded on the charts were obtained by boiling a test tube full of a filtered, 24-hour specimen of urine. After allowing the coagulated albumen to settle to the bottom by standing three or more hours in the tube we measured in inches the column of albumen in the tube and compared it in parts per hundred with the column of urine in the tube. This procedure served our purpose in ascertaining if the albumen was increasing or decreasing at the end of each day.

Serum treatment.—The immediate diagnosis and the treatment of the disease are problems of great importance to the future workers with yellow fever.

As to the treatment, we submit to readers our experience with the first anti-*Leptospira icteroides* serum ever administered to a human being. At the Rockefeller Institute was prepared a serum from the horse similar to that developed for diphtheria, and this serum was in the possession of the Rockefeller Commission at San Salvador when we requested the workers to come to Amapala, Honduras. The serum was about a month old when given to the patient and was bottled in 20 c. c. quantities in 0.3 per cent tricesol. At this writing our one case aboard the *Chicago* has supplied the only opportunity in which early and careful observation favored the giving of the serum. It is thought that to be efficacious the serum must be administered within the first four days of the onset of the disease, before the endothelial damage has reached its height, pictured in the well known symptoms of hemorrhages, jaundice, and marked albuminuria.

Mitchell's case was grave from the beginning. For two days his temperature ranged above 105 F., distinctly higher than the usual yellow fever temperature. Albumen appeared early on the second day with a pronounced oliguria. His most prominent symptoms were of the nervous system, in which marked restlessness, occasional de-

lirium, attempting to jump out of bed, unconsciousness, and his calling for the urinal without being able to urinate, predominated. This marked activity required a special hospital corpsman to watch and control the patient night and day. Many authorities have noted that a high initial temperature gives a bad prognosis in yellow fever, and especially if there is no remission but a constant temperature on and after the second day. This observation combined with the marked early nervous phenomena witnessed in Mitchell's case caused us to unanimously predict a grave termination.

Consultations were held twice a day aboard the *Chicago* at which every phase of the progress of the patient was thoroughly gone over. We unanimously decided that to save Mitchell's life the risk of administering an experimental dose of the anti-*Leptospira icteroides* serum intravenously was warranted. Gen. Lysters' attitude was especially commendable, since he, although very anxious to try out the serum on a human being, delayed his approval long after the majority of the consultants had convinced themselves that the serum was the last resort.

Noguchi advocated 40 c. c. as the dosage, but we gave at the first treatment 20 c. c. intravenously. The patient grew no worse nor did he give evidence of any marked reaction. He held his own for 24 hours, when another 20 c. c. was given him and this was repeated after 8 hours. From that time on the patient improved in every way, his slowest convalescence being in relation to the nervous and mental symptoms. No reaction occurred from the last two doses other than slight thirst and the complaint that he could "taste the stuff."

Soon after the serum was given his 24-hour quantity of urine increased toward the normal, and the albumen content did not reach the high quantity that was seen in Krollman's case. Black vomit was not experienced, although Mitchell suffered nausea frequently. Krollman did have black vomit. The jaundice in Mitchell's case was not as severe as in that of Krollman, and the latter experienced frequent hemorrhages from the mucous membranes of the nose and mouth. It seemed that the later symptoms of the disease in Mitchell were ameliorated considerably.

It is thought that the anti-*Leptospira icteroides* serum benefited the patient, but due to the fact that this was the only instance of its being given before our date of sailing, it is thought best to only hope that in the near future a report from the Rockefeller Commission will substantiate our experience in Mitchell's case with the records of many others.

Medical treatment is negligible as far as drugs are concerned, but quiet surroundings, good nursing, and withholding of all food until the fourth or fifth day constitute the very best treatment that

has as yet been found trustworthy. The taking of food promoting the subsequent engorgement of visceral vessels whose endothelium has been damaged invites severe hemorrhages. It is to the credit of our hospital corpsmen, who nursed the patients and surrounded them with every attention toward comfort and quiet, that these men recovered.

Prophylaxis and immunity.—On the day of the arrival aboard the *Chicago* of the Rockefeller workers, volunteers were asked for among the crew to undergo immunization with a killed culture of *Leptospira icteroides*. About 75 men volunteered, including the captain and all of the ship's officers. The prompt response to the call was credited to the fact that we had two cases of yellow fever in our sick bay. The willingness with which these men underwent immunization aided remarkably the giving of the prophylaxis to the ignorant, superstitious natives ashore. About 600 natives and foreigners living in close proximity to the infested zones in the city were given the prophylaxis.

The vaccine is prepared in the laboratory very much as that of typhoid with the exception of the culture medium used. Two doses of 1 c. c. each were given with a three or four-day interval between the injections. No serious reactions occurred aboard ship, but after the second injection a few men complained of slight localized soreness, while the captain and one other officer developed a distinct generalized erythema that soon faded, leaving no untoward after-effects.

Ashore there was a goodly number of sore arms among the natives after the second injection, but the general effect of the reaction among all those subjected to the experiment was not as severe as is usually felt in typhoid prophylaxis. One native complained of facial paralysis, but we decided that the reaction from the vaccine must have been experienced about the time his luetic constitution commenced disintegration. As a whole the vaccination was felt to be a success.

It is hoped that the vaccine promotes an immunity similar to that experienced in typhoid. So far no person thus immunized has contracted yellow fever after immunization. It will require a period of time before this form of prophylaxis can be definitely proved beneficial to those who underwent the experiment.

Clinical observations and notes.—It is interesting to note that the highest albumen content of the urine was recorded during the beginning of convalescence at a time of apyrexia, when bradycardia is registering at its lowest and when the jaundice is most intense. With regard to temperature and pulse the albumen acts the reverse of what is observed in most high-grade toxemias.

Jaundice means little in the actual diagnosis of yellow fever, for the localities where the *Stegomyia* index is highest is usually populated by races having a brown skin that does not permit a clear recognition of icterus. Jaundice seldom appears before the fourth day and this, being after the danger period of mosquito feeding is past, has no vital bearing on the early diagnosis and prevention of the spread of the disease. Its only value is confirmatory. In dark people of the Tropics icterus is clearly defined in less than half of the cases of yellow fever observed.

Of all the forms of hemorrhage recorded, sogginess and bleeding of the gums enlightens us most. Very early in the course of the disease blood can be easily extracted from the inner edges of the lips and gums by moderate pressure on a bit of that tissue between the thumb nails. Frequently the night clothes and linen are stained with spots and streaks during the night by small hemorrhages from the lips, nose, or gums not noticeable to the patient. The gums are very hyperemic, tumefied, spread over the blood stained teeth and are prone to bleed frequently. These details can be detected before black vomit, tarry stools, or hemorrhagic extravasations appear elsewhere.

Dr. Pareja, whose broad clinical experience was gained in the isolation hospital at Guayaquil, especially noted the frequency of very grave cases among the 1,500 patients he has observed, and also the rarity of his being able to see a case in its incipency. Aboard the *Chicago* we were on the lookout for yellow fever, and a standing order as to mosquito nets and thermal charting of any persons reporting to the sick bay with fever gave us a splendid opportunity to work up from the beginning the two cases occurring among our crew. In outside practice it is usual, in epidemic areas, to begin the clinical observations of a case of yellow fever about the end of the second or on the third day of the disease, but some hours or days later in endemic localities. Increased efficiency of the sanitary authorities in charge of an epidemic brings the medical officer proportionally closer to the commencement of the attack in the individual, thereby giving the patient a better chance for his life. One fatal case at Amapala was not seen until compulsory disinterment and necropsy. The case had been diagnosed by a native follower of the profession as malaria, in the absence of the vigilant members of the Rockefeller Commission temporarily on duty across the bay, and at death the practitioner had ordered the body to be buried before putrefaction commenced. He should have reported the death to us for autopsy, in any case. Such were his orders, and I think he was disciplined later by the Honduran Government for his neglect of duty.

Dutrroulau considers icterus essential to a positive diagnosis at necropsy. Jaundice is difficult to define in many fatal cases of yellow fever and especially so where disinterment becomes necessary. Dis-

integrated blood in the cardiac end of the stomach and marked fatty degeneration of the liver (boxwood liver) are sufficient for the diagnosis when found at autopsy in a yellow-fever zone.

It is very difficult to immediately distinguish the earliest symptoms of yellow fever from dengue, malignant malaria, black water fever, and infectious jaundice. Malaria very frequently complicates the disease. Practically all of the urgent calls for the assistance of the Rockefeller Commission in Central America were due to faulty diagnosis in cases of aestivo-autumnal malaria occurring in the lowland towns of the Fonseca Gulf. Many false alarms were experienced until the commission was requested by us to come to Amapala. New and wild rumors are the order of the day in yellow-fever zones, and this fact is of the greatest help and possibly should be classified as the first point of diagnostic importance, for all physicians are on edge and suspiciously looking about for *fiebre amarilla*.

If a medical officer will keep his patient mosquito free under a sound net during the first three days of the attack there is absolutely no danger of that particular patient causing any of his shipmates to contract the disease.

Years ago, while the *Chicago* was visiting at Panama, a yellow-fever epidemic occurred aboard ship in which a number of men and officers died from the disease. It was a peculiar coincidence that Gen. Lyster was in Panama at the time and went to the assistance of the medical officers of the *Chicago* during that epidemic. We are very glad to have had him with us this time as our guest and consultant.¹

ASEPSIS OF ABDOMINAL INCISIONS.

By F. H. BOWMAN, Lieutenant Commander, Medical Corps, United States Navy.

The following technique is the result of a year and a half of experimentation in the United States Naval Hospital, New York, with various methods of preparation of the patient and closure of wounds. During that period the number of operations performed daily often reached as many as 15, so that ample opportunity was afforded to observe results.

Preparation of the patient.—The night before operation the patient's abdomen is shaved and scrubbed with tincture of green soap, the operative area covered with a sterile gauze dressing, and a clean pair of pajamas given him. When brought into the operating room the whole abdomen is swabbed with 70 per cent alcohol and two coats of 3½ per cent iodine applied.

The incision.—The scalpel must have a good edge. Care is used to see that the blade is at right angles to the skin surface and that the

¹ The editor regrets his failure to reproduce the colored charts that accompanied this paper.

skin is not under irregular tension at the time the incision is made. If the knife is not at right angles a beveled cut edge is left which is difficult to approximate, and it is easy to see that if the skin is under irregular tension the incision, when the tension is relaxed, will be distorted. As soon as the incision has gone through the superficial fascia, towels are clamped along the edges of the wound so as to protect them and to prevent any infection which may be upon the skin from gaining entrance into the wound during the operation.

Closure.—The peritoneum is closed with plain No. 1 catgut, preferably with a purse string suture. All fascial layers are closed with No. 1, 10-day, chromic catgut, except in inguinal hernias, where No. 3, 20-day, chromic catgut is used to approximate the conjoined tendon to Poupart's. The subcutaneous tissue is closed with a running suture of coarse silk-worm gut, applied in the same manner as the subcuticular stitch of the gynecologist, only catching the subcutaneous tissue instead of the skin edge. The ends are left long. The skin is closed with the same material, using a subcuticular stitch. Gentle pressure is made along the wound with a sterile sponge to express any blood which may have oozed into the wound. The ends of the subcuticular stitch are now tied over a strip of sterile gauze, the gauze doubled on itself, and the ends of the subcutaneous stitch tied over all. A few more layers of gauze are added and the abdomen is strapped firmly with adhesive straps, covering the entire dressing from top to bottom. The sutures are removed in one week by cutting close one end and making traction upon the other.

By this technique the secondary infections and stitch abscesses were reduced from about 10 per cent to practically none. In the last 86 clean cases one stitch abscess developed, all others remaining absolutely clean.

Some of the factors favoring infection.—One of the most fruitful sources of infection is the rubber glove. Gloves are boiled 20 minutes and then put through the autoclave.

It is estimated that the skin remains sterile no longer than 20 minutes after the application of iodine, so that towels clamped over the skin edges would seem very necessary in operations taking longer than that period of time. This is a routine procedure in our cases. The subcutaneous tissue seems to be the least resistant of all the layers, and it is here that most infections begin. Care should be used in tying off bleeders not to include a large area of tissue in the ligatures as the mass so tied only sloughs off and forms good culture media. Catgut is no longer employed in this layer if it can be avoided, for this suture in our experience has caused practically all of the stitch abscesses which we have had.

There is a great tendency, after closure, to swab the wound over with alcohol or iodine, or clean up the operative site in some man-

ner, upon the theory that if alcohol and iodine give primary healing in dirty lacerated wounds, the same procedure is indicated in clean wounds. This was tried over a considerable period of time, but was very disappointing, as infections were markedly increased. Now, the wound is not touched after the skin is closed except to squeeze out any collection of blood or serum which may have accumulated underneath the surface. It would seem that the clotted blood between the cut edges of a perfectly clean wound acts like an antiseptic glue, securing the edges and sealing the wound from outside infection, and it is a great mistake to remove it.

We have found that it is necessary to entirely cover every vestige of dressing firmly with adhesive straps, as there is a great tendency on the part of the patients to lift up the edges of the dressings to look at their wounds, and a number of infections have been traced to this source.

One big advantage in the silkworm gut stitches, inserted in the manner described above, is that in cases where there is some question of draining, a small tube can be inserted and the stitches taken around it. After 48 hours if the wound remains clean, the tube may be withdrawn and gentle traction upon the ends of the silk worm gut will approximate the edges of the wound, and primary union will take place in the same manner and with as good cosmetic results as in cases without drainage.

INTRAVENOUS USE OF CALCIUM CHLORIDE FOR HEMOPTYSIS.

By W. H. FICKEL, Lieutenant Commander, Medical Corps, United States Navy.

Much has appeared in medical literature of late regarding the use of calcium chloride in the treatment of different complications of tuberculosis, but so far nothing has been said as to its use by intravenous injection for hemoptysis. Calcium chloride and calcium lactate have long been used by mouth in saturated solutions. Calcium chloride has been used in strengths varying from 2½ to 5 per cent as a routine treatment for tubercular diarrhea. During the current year (1919) there have been about 700 tuberculous patients at this hospital¹ all the time, and of course hemorrhages from the lungs were of common occurrence. We have found that by the use of calcium chloride, given as will be noted later, hemorrhages can be controlled, and in many cases cease never to recur. There has certainly been every chance to try it here.

One authority claims that calcium chloride acts first as a coagulative, and that when it is continued it will have an opposite effect.

¹ U. S. Naval Hospital, Fort Lyon, Colo.

This has not been borne out by our experience, for we have had several patients with hemorrhage records who have been given calcium chloride regularly. As long as five months have elapsed since, and none of them has had hemorrhages during that time. A 5 per cent solution of calcium chloride has been given intravenously with very favorable results in the diarrhea of tuberculosis. Favorable results have been noted, however, only in those cases where ulcers have not been present. In two cases in which it was used without results, ulcerations were found at postmortem. When we began to get favorable results from the use of this drug, all records were gone over, and every patient giving a history of hemorrhage from the lungs was then given 5 c. c. of a 5 per cent solution intravenously, and up to this time not one of the above-mentioned patients has had a hemorrhage, though several of them have had blood in their sputum for a day or two at a time.

Experiments were then carried out to determine the best dosage. The dose of calcium chloride by mouth being 30 grains, an intravenous dose of nearly that amount was given, and no ill effects have been recorded. At last it was decided that the best results were obtained from 5 c. c. of a 5 per cent solution, repeated if necessary in a very few minutes. But we found it seldom necessary. This dosage was made a matter of routine for patients with history of hemorrhage, and was repeated about every 10 days. It has been found that, when given to patients with blood in their sputum, though it did not stop the blood entirely, none of them developed a hemorrhage. Several continued to have blood streaked sputum, but soon changed in color until at the end of a week it was dark chocolate color, and then ceased entirely.

The following reports of cases show typical dosage and results:

Case 1.—During the first week of July a patient was having his third hemorrhage within two weeks and was bleeding very fast. He had been given morphine and ice bags to chest, but could not be given anything by mouth for he was coughing up the blood too fast. A 2½ per cent solution of calcium chloride was made and autoclaved, but before it could be prepared for intravenous injection the patient was very hysterical, and cried for fear he would die. Accordingly 7 c. c. of the solution was given intravenously, and within 5 minutes his hemorrhage had stopped so that his sputum was only blood streaked, and that soon cleared up. He has since been getting the 5 per cent solution every two weeks, and up to the present time has not developed any more hemorrhages. He has gained in weight, feels well, and has been able for two months to live at home.

Case 2.—B., up to June, had had four hemorrhages since coming to this hospital three months ago. On July 20 he developed another and was at once given 5 c. c. of a 5 per cent solution. The hemor-

rhage stopped, but he continued to have blood-streaked sputum. The same dose was soon repeated, but the blood continued. The dose was increased at intervals until he received 20 grains a day. The sputum changed until at the end of a week it was dark chocolate in color, and then cleared up. His sputum also at the end of the week was very tenacious. Careful examination showed no pneumonia. Since then he has taken the calcium chloride regularly, and has not experienced a hemorrhage, nor has he had blood in his sputum. He has since gained in weight, is up and around, and his condition is much improved.

Case 3.—C. had been in this hospital nine months up to June, and had had 52 hemorrhages recorded. During the second week in July he was given calcium chloride as a prophylactic as routine, and up to the present time has not developed another hemorrhage.

Case 4.—An officer has had three periods of hemorrhage within six months; that is, in December, 1918, he bled for eight days; in May, 1919, for several days; and in September, 1919, started again. Coagulose was given at once and repeated in six hours, but the hemorrhage continued. He was also given morphine, calcium chloride, and calcium lactate by mouth. On the third evening he was given 5 c. c. of a 5 per cent solution of calcium chloride intravenously and the hemorrhage stopped. The same dose was repeated in two hours. Though he has not had another hemorrhage, the next day he expectorated a large clot of blood. Up to the present time he has not bled again, and is up and about. Has gained weight and says he feels fine.

Cases 5 and 6.—Two cases with hemorrhage records that were taking calcium chloride discontinued taking it as a prophylactic. One had a return of hemorrhage on the twenty-first day, and the other on the twenty-second day.

Case 7.—A patient in a convalescent ward was reported at 4 a. m. to be bleeding, and was given 5 c. c. of a 5 per cent calcium-chloride solution and the hemorrhage stopped. Again at 10 a. m. he was reported as having another, and the calcium chloride was repeated and the hemorrhage stopped again. At 4 p. m. he was again reported having another hemorrhage and got 5 c. c. more with the same result. At 7 p. m. it started again, and he was then given 20 c. c., but this time the bleeding did not stop as soon as expected, and examination showed that he was bleeding from the posterior part of the nose and not from the lungs. His nose was packed and he had no more hemorrhages. He was given in all during the day 26.6 grains, and no ill effects were noted.

Case 8.—An officer has had chronic diarrhea most of the time since 1917. Stools were examined for dysentery and other parasites and found negative. He averaged five stools a day. He was given

5 c. c. of a 5 per cent calcium-chloride solution and since then there was one stool a day most of the time, and never over two.

Case 2.—A civilian employee living nearby started to bleed at noon and was given morphine and an ice cap to the chest. At 3 o'clock he was brought into the hospital on a stretcher still bleeding and the wash pan that he had bled into on the way was more than half full of blood. Five c. c. of 5 per cent calcium chloride solution were given and within five minutes the hemorrhage stopped. Twenty minutes later the calcium chloride was repeated in the same dose. That was two weeks ago and he has not had another hemorrhage.

The conclusion we have drawn from the intravenous use of calcium chloride here may be summed up as follows: First, it has been found to control and to prevent hemorrhage from the lungs. Second, it is of great benefit in tuberculous diarrhea. Third, it is non-toxic, even when given in very large doses. Fourth, its continuous use will not lower the coagulability of the blood.

Technic.—Make a five per cent aqueous solution and autoclave three times. The small common hypodermic needle on a glass syringe is better than the larger needle usually used in giving intravenous injections. The solution should be given at body temperature and very slowly, otherwise the patient will complain, for a short while, of shortness of breath and of a burning sensation all over the body. If the hemorrhage is severe as much as 15 c. c. may be given or 5 c. c. repeated in a few minutes. It is also well to place an ice cap over the chest at the same time. We have also found that it takes longer for calcium chloride to act when morphine has been given first, especially if given in very large doses. To have the syringe and needles ready at all times we keep them in alcohol and the syringe need not be washed out before using.

HOSPITAL RECORDS.

The question of keeping adequate permanent records of patients after their discharge from hospital became an acute one during the war owing to the great increase in the number of patients handled by our naval hospitals. Transfer of patients from one naval hospital to another was very frequent and the oft-recurring occasion to consult data regarding patients no longer in an institution, not only for purposes of the Government but in order to reply satisfactorily to inquiring friends and relatives, emphasized the fact that in a great many cases the information contained in General Register of Patients was insufficient. In former times it was the practice to write to the Bureau of Medicine and Surgery for such additional data as was not contained in General Register of Patients, but under the

stress of war it became evident that more detailed records of the cases treated must be on file in each naval hospital.

The whole subject was a matter of no little interest during the war and much time and study was devoted to it, more particularly by medical officers serving under temporary commissions. Many of these officers were familiar with the system of case records employed in civilian hospitals and were impressed by the meager character of the permanent records in our several naval establishments, not realizing, perhaps, that unlike civil hospitals the Navy hospitals are part of a single definite organization and that the various forms on file in the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., constitute a complete and permanent record, both as to official and clinical data.

Practically in each one of our naval hospitals the staff devised and put into effect a system of clinical records by charts or cards which seemed to meet its individual needs. Each of the different systems employed had some special merit and all were full and complete but they were too elaborate to be adapted to the conditions that maintain since demobilization. The personnel of the various hospitals has been largely reduced and whereas during the war the number of officers on duty made it possible to go into great detail, the fact that now the work formerly done by four or five men often falls to a single officer makes simplicity and brevity imperative.

As examples of the more complicated records of the war period there are reproduced here two series of record cards or charts, the first being the one worked out at the U. S. Naval Hospital, Great Lakes, Ill., while the second series shows corresponding forms employed at the U. S. Naval Hospital, Philadelphia, Pa.

The third exhibit is a suggested form of record for the permanent files of a naval hospital. It is proposed to print on the back of every clinical chart sheet a form which will permit the entry of the principal facts relating to each patient. In a complicated and prolonged case the use of a number of clinical chart sheets automatically provides for amplification, if necessary, of the record. Any changes in laboratory findings (c. f. change in white count, appearance of agglutinins in serum, etc.) after the original study of the case, will be entered, whenever obtained, on the clinical chart, under "remarks."

It is earnestly requested that the commanding officers of naval hospitals and medical officers, generally throughout the service, study the proposed record form and submit suggestions and criticisms to the Bureau of Medicine and Surgery and the editor of the *BULLETIN* will be very pleased to receive definite practical suggestions along these lines for publication and discussion.

C

U. S. NAVAL HOSPITAL, GREAT LAKES, ILL.

LABORATORY REPORT

Name _____ Ward _____ Date _____ 191.

Request of Dr. _____

<i>Gastric analysis</i>	<i>Feces</i>
Appearance _____	_____
Total acidity _____	_____
Free HCl _____	_____
Combined HCl _____	_____
Lactic acid _____	_____
Blood _____	_____
Bile _____	_____
Microscopic _____	_____
Miscellaneous _____	_____
_____	Examined by _____
_____	Medical Corps, U. S. N.

D

U. S. NAVAL HOSPITAL, GREAT LAKES, ILL.

LABORATORY REPORT

BLOOD

Name _____ Ward _____ Date _____ 191.

Request of Dr. _____

White blood count (total) _____	Wassermann _____
Red cell count _____	Malaria _____
Hemoglobin _____	_____
<i>Differential count</i>	Blood culture _____
Total number counted _____	_____
Poly. neutrophils _____ %	Miscellaneous _____
Lymphocytes (large and small) _____ %	_____
Eosinophiles _____ %	_____
Basophiles _____ %	_____
Mononuclears _____ %	_____
Myelocytes _____	_____
Nucleated red cells _____	_____
Other cells _____	_____
_____	Examined by _____
_____	Medical Corps, U. S. N.

(Plk card.)

E

U. S. NAVAL HOSPITAL, GREAT LAKES, ILL.

LABORATORY REPORT

URINE

Name _____ Ward _____ Date _____ 191__

Request of Dr. _____

Transparency----- | **24-hour specimen**-----

Color-----	Special tests and microscopic
------------	-------------------------------

Reaction _____

Specific gravity-----

Albumen -----

Sugar _____

Bile -----	-----
-------------------	-------

Blood _____

Acetone _____

Diacetic acid_____

Medical Corps, U. S. N.

(Yellow card.)

F

U. S. NAVAL HOSPITAL, GREAT LAKES, ILL.

X-RAY REPORT

Name_____Rate_____Ward_____

-----191-----

Request of Dr. _____

Part examined _____

Radiographic findings-----

-----*Surgeon.*

(Blue card.)

G

U. S. NAVAL HOSPITAL, GREAT LAKES, ILL.

REPORT OF OPERATION

Name.....Rate.....Date of operation.....
 Surgeon.....Assistants.....
 Anesthetic.....Anesthetist.....
 Began.....Closed.....
 Instrument nurse.....Sponge nurse.....
 Remarks regarding mucous, pulse, resp.....

 Preoperative diagnosis.....
 Operation.....
 Began.....Closed.....
 Findings.....
 Gross.....

 Microscopic.....

 What was done.....
 Technique.....Result.....
 (Buff card.)

H

U. S. NAVAL HOSPITAL, GREAT LAKES, ILL.

AUTOPSY REPORT

Name.....Rate.....Date.....
 Request of Dr.....
 Clinical diagnosis.....
 Parts of body opened.....
 Autopsy findings.....

 (Continue on reverse side.)
 Post-mortem diagnosis.....

 Surgeon.

II

A

CLINICAL CHART.

(Name.)	(Rate.)	(Age.)	(Color.)
(Nativity.)		(Disease.)	

Month.	Day.	Time.	Pulse.	Resp.
				97°
				98°
				99°
				100°
				101°
				102°
				103°
				104°
				105°
				106°
				107°
Remarks.				

Enter only one temperature in any block. Two or more blocks may be used for one day. Draw heavy line to separate calendar days.

U.S. Naval Hospital, Philadelphia, Pa. Chart No. 1 (reduced).

B

WARD OFFICERS' ORDERS.

Name....., Rate....., Ward.....

[illegible]

U. S. Naval Hospital, Philadelphia, Pa., Chart No. 2 (reduced).

C

TREATMENT RECORD AND NURSES' NOTES.

Name..... Rate..... Ward.....

[illegible]

U. S. Naval Hospital, Philadelphia, Pa., Chart No. 3 (reduced).

D

CLINICAL RECORD.

Name..... Rate Sheet No.

All clinical reports, including X-ray, genito-urinary, eye, ear, nose, throat, etc., must be included in this clinical record.

Date.	
-------	--

Use both sides.

U. S. Naval Hospital, Philadelphia, Pa. Chart No. 4 (reduced).

E

U. S. NAVAL HOSPITAL, PHILADELPHIA, PA.

Name..... Rate..... Ward.....

Born..... Place..... Color.....

A. RA..... Diagnosis on admission.....

D. R. IS. DD..... 1919..... Final diagnosis.....

Chief complaint..... End result.....

Surgeons attending.....

History of present illness:

.....

.....

.....

F

U. S. Naval Hospital, Philadelphia, Pa. Chart No. 5 (reduced).

EXAMINATION ON ADMISSION.

Date..... Ward.....

Name..... Rate..... Ward officer.....

Appearance		Skin
Glands		Superf. veins, arteries
Bones, joints, extrems.		Muscles
Head	Face	Eyes
Lips	Teeth	Ears
Neck		Tongue
	Thyroid	Nose
		Throat
		Chest
Lungs: Front right		
Front left		
Back right		
Back left		
Cardiovascular		
Abdomen: Digestive		
Liver	Spleen	
Genito-urinary		
Central nervous	Reflexes	
Mental		
Conclusions		

Use other side for detailed description

U. S. Naval Hospital, Philadelphia, Pa. Chart No. 6 (reduced).

G

REPORT OF LABORATORY EXAMINATION

Name Rate Ward

URINE.

Date.	Color.	React.	Sp. gr.	Alb.	Sugar.	Other chemical and microscopical.
.....
.....
.....
.....

BLOOD.

Date.	Hb.	R. B. C.	C. I.	W. B. C.	Poly.	Trans.	L. M.	S. M.	Eosin.	Baso.	Other findings.
.....
.....
.....
.....
.....
.....
.....
.....
.....

Special blood:

Sputum.				Wassermann.			
Date.	Findings.			Date.	Findings.		
.....
.....
.....
.....
.....
.....
.....
.....
.....

MISCELLANEOUS EXAMINATIONS.

Date.	Throat, gastric, fecal, etc., or continued examinations of the above.
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Use both Sides.

U. S. Naval Hospital, Philadelphia, Pa. Chart No. 7, front (reduced).

MISCELLANEOUS EXAMINATIONS—Continued.

Date.	Throat, gastric, fecal, etc.
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

U. S. Naval Hospital, Philadelphia, Pa. Chart No. 7, back (reduced).

H

OPERATION REPORT.

U. S. Naval Hospital, Philadelphia, Pa. 191

Name of patient..... Rate.....

Operator..... Ass't.....

Anesthetist.....

Anesthetic used..... Quantity.....

Anesthesia started..... Pulse start..... Respiration start.....

Operation started.....

Anesthesia stopped..... pulse stop..... Respiration stop.....

Operation stopped..... Operation time.....

Sponge count, large..... small.....

Operation and gross pathology.....

.....

.....

.....

.....

.....

(Signature of recorder.)

(This form to be used for data for operation book, and then to be attached to bedside record.)

U. S. Naval Hospital, Philadelphia, Pa. Chart No. 8.

I

REQUEST FOR X-RAY.

Name..... Rate..... Ward.....

Admitted from..... Date.....

Number of X-ray examinations and dates.....

Brief history of present illness or accident (if injured, how).....

.....

Examine for.....

.....

Ward officer.

X-RAY REPORT.

Name _____ Rate _____ Ward _____

Number of plates made at this examination_____

Part examined-----

X-ray findings-----

Date_____

X-ray officer.

(Enter this report on clinical record then return this form to the X-ray department.)

U. S. Naval Hospital, Philadelphia, Pa. Chart No. 9 (X-ray) reduced.

III

CLINICAL CHART.

....., (Name.) (Rate.) (Age.) (Color.)

.....,
 (Nativity.) (Disease.)

Month.	Day.	Time.	Pulse.	Resp.
			97°	
			98°	
			99°	
			100°	
			101°	
			102°	
			103°	
			104°	
			105°	
			106°	
			107°	
Remarks and concise abstract of examinations as they are made.				

Enter only one temperature in any block. Two or more blocks may be used for one day. Draw heavy line to separate calendar days.

Front of the proposed charts for permanent hospital record (reduced). The following form would be printed on the back.

CONCISE ABSTRACT FROM HEALTH RECORD.

(With date of admission and discharge.)

.....

.....

.....

Notes additional to those from Health Record (when necessary):

Family history.....

.....

Personal history.....

.....

Present illness.....

.....

.....

Diagnosis.....

.....

Diagram of chest
and abdomen.

Physical examination.

Diagram of chest
and back.

LABORATORY EXAMINATION.			
Urine.	Blood.		Sputum.
Color.....	Hgb.....%	Lg. Mon.....%	Wassermann.
React.....	R. B. C.....	Lymph.....%	
Sp. Gr.....	C. Ind.....	Eosin.....%	
Alb.....	W. B. C.....	Basoph.....%	
Sugar.....	Poly.....%	Other cells.....%	Feces.
Microscopical.....	Trans.....%		
	Miscellaneous.		

NOTE.—Subsequent physical and significant laboratory examinations to be noted on reverse side day to day, under remarks

HISTORICAL.

THE ARABIANS AND THE FIRST REVIVAL OF LEARNING.

Egypt, Greece, Rome, and Constantinople had served in turn as the foster mother of the art of healing. With the eighth century the scene changes again and the Arabians, who had leaped into prominence under the religious and political guidance of Mahomet, assumed the task of preserving the traditions of the past and of forging ahead along the lines adapted to their peculiar genius.

While Italy became the prey of barbaric hordes and as Byzantium degenerated into the home of court intrigues, religious disputes, and effeminate luxury, Arabia was working out for itself a new civilization with intellectual development as one of its chief aims. Mahomet, the great religious teacher who first saw the light at Mecca, 670 A. D., had infused into his followers all the enthusiasm and energy appropriate to a new and militant creed and they had little difficulty in conquering a wide domain in which to give full sway to their ambition.

Everything favored the success of a new purveyor to the muses and gave strength to a new political power in the history of Europe. The Empire of the West was practically defunct. The Empire of the East was stewing in its own fat. The last beam of military glory had rested on the banners of the brave but unfortunate Belisarius, whose successor, the eunuch Narses, only prolonged for a brief season the prestige of Justinian. The Gothic kingdom of Italy enjoyed a brilliant but brief existence phenomenal in history. The rule of the Exarchates at Ravenna was impotent and short-lived. Italy became the property of the Longobards and Rome's rule was replaced by that of the Franks in Gaul and of the Visigoths in Spain. Soon we find Saracen influence and Saracen power creeping up the coast line of southern Italy and modifying the last stronghold of Greek thought and manners in Europe. The spirit of Mahomet held sway along the Mediterranean littoral of Africa and Asia Minor. It advanced across the Pyrenees. When Charles Martel, on the field of Poitiers, 732 A. D., stemmed the tide of military invasion which threatened to change the whole face of Europe and would in time have reduced its people to the level occupied by the Moslems of today the Arabist expansion took the form of intellectual instead of territorial growth.

In less than two centuries after the birth of the Prophet the Moslem mind had gained a complete ascendancy over the people of southern Europe and of contiguous portions of Africa and Asia. Bagdad, Damascus, Bokhara, Ispahan, Herat, Seville, Toledo, Valencia, Muer-cia, Granada, Cordova, Tunis, Morocco, and Fez became centers for the assemblage of the learned and the dissemination of their views. The love of classic learning possessed every man whose station or fortune raised him above the common herd. It became the passion of the great and the rich to found a hospital, enlarge a library, or endow a school. They delighted in importing and supporting foreigners of any race or creed provided they brought with them some contribution of value to the common store of knowledge.

Under Almansor and under Haroun al Raschid (reigned from 786 to 808 A. D.) dear to every juvenile heart to-day through his connection with the "Arabian Nights' Entertainments," Bagdad became the world's emporium of trade, the leader of fashion, the molder of opinion. Its marts, its libraries, its schools were unrivaled. It was the home of luxury and refinement. The rule of the caliphs was tyrannical, but their absolute power was exercised on the side of enlightenment, and their toleration of Jew and Gentile was in marked contrast to the prejudice and persecution rampant in many a Christian kingdom. They cared little for the private beliefs of the true scholar. More than one heretic fleeing from the animosities of a narrow orthodoxy in Christian lands found safety under the crescent in return for such nuggets of wisdom or Greek lore as he might possess. Foreigners versed in the Cyriac and Persian languages were equally welcome.

Fabulous sums were paid for manuscripts or expended in salaries for translators and teachers. The son of Haroun al Raschid employed Honain, a Christian, author of the first Arabic text on the eye, for 45 years at a munificent salary to translate and interpret Greek and Roman classics. In spite of changes of dynasty and whether the seat of power was at Bagdad or Cordova this liberality prevailed. In the ninth century Christian physicians were almost as numerous in Bagdad as were the Arabian. In 914 A. D. Vizir Ali ben Issa founded a hospital in Bagdad and when asked by the physician in charge what policy was to be followed in regard to people of different religions, replied, "Use the funds for the benefit of all classes alike and be sure to remember the animals."

The later fruits of Arabist culture ripened in Spain. Students from all over Europe flocked to the schools of Cordova, Toledo, and Seville for instruction in the arts and sciences. Spain in the tenth century boasted 14 academies and 5 considerable libraries, those of Cordova, a city of innumerable baths, mosques, and palaces, and a hundred thousand inhabitants, making it a serious rival of Bagdad.

Of the countless comforts and refinements introduced into daily life by the genius of the followers of the Prophet this is no place to speak but the chemise of women and that humble but important detail of domestic architecture, the water closet, may be mentioned as details of hygiene and sanitation. The beautiful and sumptuous Alhambra contained a small but useful apartment of a type not seen since the early period of the Cretan civilization. Window panes, street lamps, and elaborate provisions for bathing may be referred to since they bore on health and cleanliness; the cultivation of fruits affected diet; the employment of *cannabis indica* and of certain inhalations for purposes of anesthesia were a part of medicine.

The art of making paper was known to the Chinese as early as the second century B. C. and was introduced into Europe by the Arabs in the eighth century A. D., and not a few old manuscripts are on this substance; but parchment, the substitute for the older papyrus, continued in general use even after the establishment of a paper factory by the Moors in Spain (twelfth century). The use of paper for literary purposes was not general until the fourteenth century when Italy became the principal source of supply. The first Italian paper mill was set up at Fabriano in 1276 and a hundred years later the manufacture was regularly carried on at Padua and one Pacifico of Fabriano started an extensive factory at Treviso. The general substitution of paper for parchment greatly facilitated the making of books when printing was invented early in the fifteenth century and for 500 years the presses of Germany were supplied by the mills of northern Italy.

An Arabian school and academy included lecture rooms, residences for the faculty and even for some of the students, and had hospitals and dispensaries attached, though there were no separate medical schools. For the Arabian physician medicine proper was but a small part of what he had to know. It belonged to a liberal education, but was not more than on a par with other essential branches of science. Manifestly, therefore, they could not develop much that was new in a department that required so much time-consuming effort. They turned to Greek medicine as to a storehouse already well stocked and used Greek philosophy as a basis for elaboration and not as the starting point for discovery. Actual progress depended on the initiative and energy of the individual and not of the race.

As a class Arabian physicians were distinctly affected by Oriental tradition and inclined to speculation rather than investigation, though they were original in the domain of pharmacy and chemistry, branches to which they contributed not a little, inspired, perhaps, by the example of the Nestorian school of practice in which the prescriber and the compounder were very early dissociated. The basis of instruction in the schools was the teaching of Hippocrates, Galen, Oribasius, Aëtius, and Paul of Ægina. In general terms it may be said that the value of the Arabian revival of learning in relation to medicine was in the preservation of records of what had gone before

and in the perpetuation of an interest in those records. On the other hand, chemistry, pharmacy, and botany were largely developed by the Arabians and they were painstaking and accurate clinical observers. Unfortunately their religious views, essentially fatalistic, their social customs, and their native mode of thought were radically unfavorable to surgery. A disposition to casuistry and unwillingness to soil their hands had a lasting and disastrous effect on this important branch of practice which, because radical and materialistic, would, if more generally cultivated, have hastened the development of a true anatomy and a true and useful physiology. They were strongest in their schools, where teaching was systematic and thorough; the clinical material of their hospitals was studied to the best advantage.

Though the Arabian physician was not always above chicanery and deception, and often resorted to cunning tricks to enhance belief in his skill, it was distinctly a nontheurgic medicine that he practiced. While among Europeans, except for the School of Salerno, medicine had sunk to the level of a mere appendage of the work of the clergy, it remained for the Arabians a specialized profession for laymen. Finally, we must credit them with the popularization of asylums and hospitals independent of ecclesiastical control. Bagdad, Damascus, and Cairo boasted the most famous of these establishments.

As has been said, the study of medicine was a part only and not by any means the principal feature of their institutions of learning. It ranked after philosophy, astronomy, physics, and mathematics, and it was medicine in a restricted sense since surgery was beneath the dignity of a man of learning, and gynecology and obstetrics were not for the male practitioner. But physicians were distinctly encouraged and honored whether they sought a livelihood by attending the bedside or as professors of the wider learning. They were plentiful in numbers and those conspicuous for ability were showered with money and distinctions by the caliphs they attended. The common people were of course served by less proficient men. Both types indulged too often in the methods of the charlatan, for at all times and in all places human credulity has found the faker ready to gratify it. The gullible patient and the quack are counterparts and complements of each other and grow in the same garden.

Not a little of the Greek learning which the Arabians acquired came to them through the Jews scattered throughout Asia Minor and Persia, and through the Nestorians. Jews, Persians, and Arabians of the period had a common bond in their strong monotheism. All three looked with abhorrence on the Christianity which, from about the time of Constantine on, had undergone a process of apparent assimilation to certain features of pagan forms of worship, if not of belief, lead by the church into whose hands the disintegrat-

ing empire and the circumstances of the times, as well as its own ambitions, had thrown no small political power. The worship of the Virgin Mary, nowhere enjoined in Scripture; the multiplication of the saints and the assignment to them of intercessory functions; the steadily increasing use of images and symbols; the development of an elaborate ceremonial worship; the relic hunting of Helena, mother of Constantine, were all features which to superficial view and to hostile observers suggested pagan practices and smacked of idolatry and polytheism. No real or supposed tenets of belief could have been more fundamentally opposed than these to the trio of races mentioned. To the Jew, brought up to worship Jehovah alone, it was sacrilege and profanation to associate with the Deity, even a Divine Son, and from the time of Moses the making of any graven image was strictly forbidden. To Mahomet's followers such ideas were also revolting. They were forbidden to paint or carve any human, animal, or vegetable form of life, and the arabesque is the artistic and fanciful creation of imagination restricted to patterns and decorations essentially geometric in origin. It is not surprising therefore that with such common ground of accord these races should have readily worked together in medicine as in other sciences.

The church, taking fright at the new and startling beliefs begotten of independent thought in the very members of its priesthood, endeavored, so as to maintain its own authority, to crystallize the orthodox beliefs as church dogma which must be universally accepted. Arius, a churchman of Alexandria, had attacked the doctrine of the Trinity. He was condemned by the Council of Nicaea, though under the successors of Constantine the Great, Arianism was upheld by synods at Milan and Arles. Pelagius (the "seaman") a native of Britain or Brittany, starting out to controvert the low beliefs of Gnostics and Manichaeans, had ended by attacking the doctrine of original sin and predestination, giving utterance to ideas that underlay the bulk of religious and philosophic controversy until after the Middle Ages. The Synod of Carthage discredited him (416 A. D.), but in the ensuing 25 years some 30 synods discussed his opinions. Nestorius, Patriarch of Antioch, was deposed by the Third General Council of Ephesus and sent away to die in exile because of his heterodox views. He held, for example, that Mary should be called the "Mother of Jesus" and not the "Mother of God," and he insisted on a distinction between the human and divine natures of Christ. His large following shared his exile or endured the position of social outcasts. Many of them took up the study of medicine. Persecution scattered them throughout the East. They went to Syria, Mesopotamia, and Persia, and there is extant to-day a Nestorian monument of the sixth century at

Siang-fou, in western China, the town whither the late Dowager Empress refugeed during the Boxer uprising in 1905. Wherever they went the Nestorians preserved their Greek culture as well as their simple faith and peace-loving, studious mode of life. They were welcome additions to any community and lived in harmony with the natives and with the Jews, whose dispersion was also general. At Edessa, in Mesopotamia, there had existed for some time two hospitals, one exclusively for women, and a school where instruction was given in three languages. These establishments the Nestorians acquired, and they founded a medical school and made the town an important medical center.

When Zeno ordered this school closed and drove out the Nestorians they betook themselves to Djondisabour, in Khorassan, took over the university and hospital there, and introduced clinical methods in the instruction of medical students. Djondisabour dated from the time of Sapor II, and strictly Hippocratic medicine was taught there. Persia had numerous Christian inhabitants before the arrival of the Nestorians, and it is probable that even before the founding of this city Greek thought had been introduced by the men who settled there in the wake of the conquests of Alexander the Great. Later still when Justinian, a great meddler in religious affairs, closed the pagan academies of Athens, many learned Greeks flocked thither, so that by the time Arabia began to seek Greek culture Djondisabour was a fountain of general classical as well as of medical learning.

Cyril, Patriarch of Alexandria, champion of the worship of the Virgin, and the bitterest antagonist of Nestorians, had caused Hypatia, daughter of Theon the mathematician, to be attacked in the streets of Alexandria, stripped naked, dragged into a church, and there killed and cut into pieces. This pure, beautiful, and accomplished but pagan maiden had lectured on philosophy in the gay and dissolute city, drawing away attention and patronage from the fashionable preacher, who doubtless saw in her fascinations and learning nothing but the agencies of the world, the flesh, and the devil. With her death, Greek philosophy and learning departed from Alexandria, which had been its fostering home for 700 years.

These details of religious conflict and persecution have been given to make clear how much that was not Greek but of distinctly Asiatic origin passed into the hands of the Arabians and to bring out also the fact that not a little of what we commonly call Arabic was also Jewish or Persian. It may be noted in passing that the school of Djondisabour required an examination for graduation in medicine and that the first regular pharmacopœia had its origin there. All this ferment of thought, these agitations and changes in belief, came

at an opportune time for the rising civilization of the Moslems, and made them the natural repositories of antiquity's culture.

But the Arabians, like every other race, experienced the ebb and flow common to all the agents by which the human race moves forward and upward. When in 1453 the banner of the crescent supplanted the cross on the walls of Constantinople the heritage of the learning of the ancients reverted once more to the people of Christian Europe.

Almansur (reigned from 712 to 735 A. D.), the second caliph of the Abassid dynasty, having resolved to introduce Greek arts and sciences into Arabia, turned naturally to Djondisabour as a place likely to supply him with the teachers, translators, and doctors he required in Bagdad. In George Baktichou, head of the hospital and school at that important educational center, he found the person he needed to create a library for his capital and though illness prevented him from retaining for long a position at court he was rewarded for what he had begun to do by a present of 10,000 pieces of gold. His son carried on the translating and the educational work initiated by George and first held the position of archiater in the Moslem dominions. Soon after assuming his father's work he was sent for to consult with the regular court physicians in regard to Haroun's health. His rivals, through malice or as a test of his acumen, submitted to his judgment a sample of urine obtained from a beast of burden, though it purported to be the Caliph's urine. Happily, Baktichou either had been secretly informed of the intended deception or suspected it for, on being asked by Haroun what measure he would suggest, answered at once that the patient in question should receive a measure of oats!

An equally amusing story is told of Gabriel, grandson of George, in connection with his curing Haroun al Raschid's favorite wife of a dislocation of the shoulder when all those who had been called in before him had signally failed. Assuring the Caliph in advance that he was acting in good faith and begging that nothing he might do in the patient's chamber be misunderstood, he walked up to the bed on the side of the affected member and without any warning made a sudden movement as if to throw off the bedclothes. Instinctively the lady made a corresponding swift movement to prevent being uncovered and the muscular action thus called into play drew the head of the bone into place.

A few of the leading members of the Arabist school most commonly referred to in modern literature are enumerated below.

Rhazes, a native of Khorassan in Persia, born about 850 A. D., was perhaps the most famous of them all. Before restricting himself to medicine at the age of 30 he had studied music, mathematics and philosophy extensively. The greater part of his life was passed in

his native town of Raj, but he held an appointment in the hospital of Bagdad and practiced there for some years. He was a hard worker and a most prolific writer, but only a very small part of his writings have been preserved to us. He commends himself to the modern student by his rare clinical insight and his clever word pictures.

The practical common sense of Rhazes is shown by his caution against the weaning of babies in summer and against opening a vein transversely. He was among the first to express rational ideas regarding the development of the human embryo, which he held to represent a complete union of the male and female element. Before his time fanciful and nonsensical ideas without number had been put forth on the subject, some writers scarcely taking the female into account at all except as the repository and source of nutrition for the fetus.

The following translation (Neuberger) from Rhazes' treatise on the difficulties which beset the physician of principle and honor reveals the profound analyst of human nature.

"Amongst those factors which make the people turn away from the intelligent physician and place their trust in impostors is the delusion that the physician knows everything and requires to ask no questions. If he inspects the urine or feels the pulse he is supposed to know what the patient has eaten and what he has been doing. This is lying and deception and is only brought about by trickery, by artful questions and speech, through which the senses of the public are deceived. Many hire men and women to find out all the circumstances of the patient and to report what is told them by servants, friends, and neighbors. I, myself, when I began to practice medicine, had resolved to ask no questions when the urine had been given me, and had been much honored. Later when it was seen that I made circumstantial inquiries my reputation sank.

"Another circumstance which brings physicians into contempt is that many diseases are too little removed from the border line of health and are thus difficult to recognize and cure; others, malignant in themselves, externally appear trivial. When the layman sees that the physician is in doubt concerning his cure he draws it as a certain inference that the physician will understand still less of severer and more extensive illnesses. This is a false analogy. The symptoms of such diseases are less obvious because they are slighter deviations from the normal, and their cure is more difficult because no drastic remedies can be applied, but only those the effect of which is gradually brought about, such as diet, etc. An official of the hospital once complained of difficulty in moving some of his finger joints on account of a small but very hard sore which had for some time resisted the remedies he had applied. He openly

reviled the physicians, saying, 'If your art does not suffice to cure a small sore on the finger how can you treat broken ribs and arms?' He then sought treatment from women and from the vulgar.

But the well-trained physician is also often in doubt and may take a long time to find the proper remedy. This occurred even to Galen. Should anyone object, saying 'He, to whom this can occur, is neither wise nor quick-witted,' we should reply: 'These designations are not absolute but relative; they depend upon the advantages that the individual may have enjoyed over his contemporaries.' If it be further objected that a matter should not be entrusted to one of whom it can not be said that he will make no mistake, we rejoin: 'Matters must be entrusted to him who is farthest from error, who errs most seldom. * * * He who otherwise refuses to employ a physician would resemble him who would not ride a horse nor sleep in a canopied bed because horses stumble and the canopy might fall down—which are rare events * * *.' A physician is sometimes undervalued who takes trouble over an incurable complaint; but the imperfection of the art should be considered, in this respect unlike other arts of which men know more than is necessary, whilst in medicine men have not yet attained to the indispensable and do not possess a remedy for every ill. The fault is therefore with the art, not the physician. The public demands that the physician should cure at a moment, like a magician, or that he should at least employ pleasant methods, which is not at all times and in all cases possible; to blame the physician on Nature's account is a great injustice. Thus it is that sorcerers make their fortune, even though they behave dishonestly, and their incompetent work brings them a good livelihood, whilst the physician with utmost endeavor can hardly obtain to bare necessities * * *. The heart of man is further turned from the capable physician and toward fools because the ignorant men and women sometimes succeed in curing complaints where this has not been done by the most famous physicians. The causes are manifold: luck, opportunity, etc. Sometimes the qualified physician effects an improvement which is not, however, yet visible; the patient is then placed under another doctor who rapidly brings about a cure and obtains the entire credit. If drastic measures are employed without knowledge and they are successful their effects are plainly visible and considered to be the result of great dexterity. If, however, they are unsuitable they kill suddenly or lead the patient into danger. The public nevertheless applauds the sudden and visible effects and neglects those who do not adopt such measures; it talks much of the wonderful cures and forgets or conceals the failures.

Many a quack is experienced in the treatment of a single complaint or two or more, according to his practice or because he has seen the treatment of an intelligent physician. Ignorant people,

therefore, think that he has an equal dexterity in everything and intrust themselves to him. It is a great mistake to think that, because he has a genuine remedy for one complaint, he has one for all. I have myself learned remedies from women and herbalists who had no knowledge of medicine."

In his work on fevers Rhazes has left remarkable pictures of the clinical manifestations and courses of smallpox and measles. The account of these diseases is the first in medical literature, though allusions to smallpox are found in much earlier writings. Rhazes not only described them well but gave evidence of being so familiar with their clinical varieties as to be able to differentiate them.

His chief work, an encyclopedia of medicine known as the "Continens," contains a résumé of what his predecessors believed, followed by the author's own views, and abounds in quotations, references, and clinical data. The best known portion is the ninth book but the whole was translated into Latin in the thirteenth century and published at the close of the fifteenth century.¹

A contemporary of Rhazes was Isaac Judaeus of Egypt who, in his treatise on diet, has a good word to say for pork. (He wrote in Arabic, not in Hebrew.) Some of Rhazes's oft-quoted sayings were original with the Jew.

Avicenna was another native of Persia. He came as a lad to Bokhara where his father held a government position. Apparently he was unusually precocious for he knew the Koran by heart at 10 and at 17 was called in consultation on a local magnate. As a reward for his efficacious advice he was granted the run of the royal library at all times. He inherited considerable means from his father and was thus able to lead a nomadic existence going from one petty court to another throughout the empire, now acquiring local fame and being rewarded with office, now fleeing for his life or suffering durance vile as a result of his political machinations. It was at Ispahan that he composed his famous "Canon." His eccentricities, his prodigious labors, his vicious excesses in the pursuit of pleasure undermined his health and at the age of 57 he succumbed to an attack of colic. The daylight hours had been crowded with the strenuous duties of state and the practice of his profession; the night was the period devoted to study and composition (with the wine cup ever at his elbow), alternating with social intercourse or amorous intrigue.

Avicenna was one of the earliest genuine students of geology. He discovered the guinea-worm and the presence of sugar in diabetic urine and was the first to describe the preparation and properties of alcohol and of ether. His "Canon" has been severely crit-

¹ Vesalius translated the ninth book. Ferragut of Salerno translated all twenty-two.

icized from the time of Arnold of Villanova, but it served as one of the leading texts for the instruction of students during a period of 300 years and would be regarded with more favor to-day, perhaps, if the appendix containing clinical studies had not been lost. He appears to have been familiar with intubation of the larynx and to have practiced reduction of spinal deformities and was doubtless an acute diagnostician and practitioner but his influence was against surgery and to that extent was unqualifiedly pernicious. With him, too, philosophy came first and medicine second. His philosophy was of a worthy type, however, and this epitome of the principles that should guide the physician is worthy of general acceptance. "We should bear in mind the infinite resources of nature, and we should never seem to abandon a patient, although we can not really do anything efficacious. Up to the last moment we should endeavor to soothe, but we must not gamble with a life by powerful remedies or big operations where there is no well grounded hope, otherwise we render ourselves voluntary homicides."

Albucasis (936-1013 A. D.), a native of Cordova, was the best surgeon of the Arabist school and the first man to write systematically on the subject; but with such a theme he naturally did not acquire in his day and in the land of his birth the popularity he deserved. The *Compendium* or "Collection" was the standard textbook of surgery throughout the Middle Ages, and Guy de Chaucer quotes him no less than two hundred times. It is based largely on the writings of Paul of Aegina but has not a little that is apparently original or at least not found in other extant works. He describes a syringe of metal with a plunger wrapped in cotton used for aural treatment; substitutes the silver for the copper or bronze catheter; recommends steel from India for instruments; gives illustrations of various surgical instruments and devices; refers to deformities of the mouth and mentions the position of dorsal decubitus with the legs hanging over the table, also described in an Italian work of the sixteenth century and recently popularized by Walcher. In suturing the intestines he recommends using scrapings from the intestinal coats of animals.

Avenzoar, son of a Jew of Seville, was born in 1113 and died in 1162. He came of an illustrious family which had given lawyers and statesman of ability to the country. His father and grandfather were physicians. From them he derived a high conception of the obligations of his calling and it is noteworthy that when after a long course of preparation he finally began to practice medicine he threw himself into it with ardor and relinquished all classical studies that he might be a doctor and nothing but a doctor. In spite of the prejudices of the times he did not disdain the manual operations of surgery, only declining to do lithotomy. He was a singularly

independent thinker and did not hesitate to challenge the authority of the pope of medicine, Galen. He was even more original in that he preferred practical demonstration to the subtleties of theories.

A friend and pupil of Avenzoar was Averroës, born in 1126 at Cordova, where his father was a prominent judge. He was a man of vast erudition and much more of a savant than a doctor. His atheism and his rejection of the immortality of the individual procured for him many enemies, and he died in Morocco repudiated by his people and anathematized by a very considerable portion of the civilized world. In the Christian system he found the doctrine of transubstantiation a block of stumbling; the Jewish system he considered bound by the fetters of law and tradition and he recognized the essentially carnal character of what the Mohammedans profess. Hence his wish that his soul might die the death of a philosopher. It was only the persistence of individual identity, however, that Averroës denied, and not immortality. The effect of his utterances was to set Europe agog. His "Colliget" enjoyed great popularity throughout the Middle Ages. It was at the suggestion of Averroës that Avenzoar undertook his great work.

The Arabians, then, began as the interpreters of Greek learning, but in preserving they also modified it, dropping some of its essential features, such as surgery, the *ultima ratio medicorum*; adding others, such as chemistry, and impregnating the whole with the spirit of their peculiar racial affinities until, upon the second and great revival of learning in the fifteenth century men had to choose between Greek medicine as procurable at original sources once made become available, and its greatly transmuted form as represented by the Arabians. Europe chose the former and infused into it the first faint breath of a really scientific spirit begotten by the crusades which had given to the people a knowledge of other lands and other races, and other purposes than their own; by the growth of the free cities; by the changed relation of different elements of society; by contact with Moslem science itself; by sad experience of the futility of relying on thoughts without supporting material facts and of reasoning apart from the testimony of the senses.

As the Reformation was a protest against doctrine separated from conduct so the later regeneration of medicine represented revolt from dogmatism without investigation.



Depositing garbage in tank.



Delivery door of garbage tank closed.



Collecting garbage from tank by cart.

SUGGESTED DEVICES.

HOSPITAL GARBAGE DISPOSAL.

By A. FARENHOLT, Captain, Medical Corps, United States Navy.

The question of the disposal of galley wastes has been satisfactorily solved at the United States Naval Hospital, Mare Island, Calif., in the following manner:

Immediately beyond the vegetable preparation room, and accessible to the main kitchen, is a room 19 feet by 5 feet 2½ inches, in the main floor of which are three drains connected below with grease trap and sewer. One drain receives wash water from the room floor, one from the garbage tank, and one from the slop chute.

The storage tank itself was made from our plans, by the sheet metal shop in the Navy Yard. It consists of an outer shell of the following dimensions: Width, 3 feet; height, 4 feet; length, 5 feet 9 inches. The material is galvanized iron, one-eighth inch thick. At the top rear angle are two hinged covers, the larger raising up from the top, and the smaller letting down from the side. This forms an opening through which the garbage is dumped into the tank. When not in immediate use, these covers are closed.

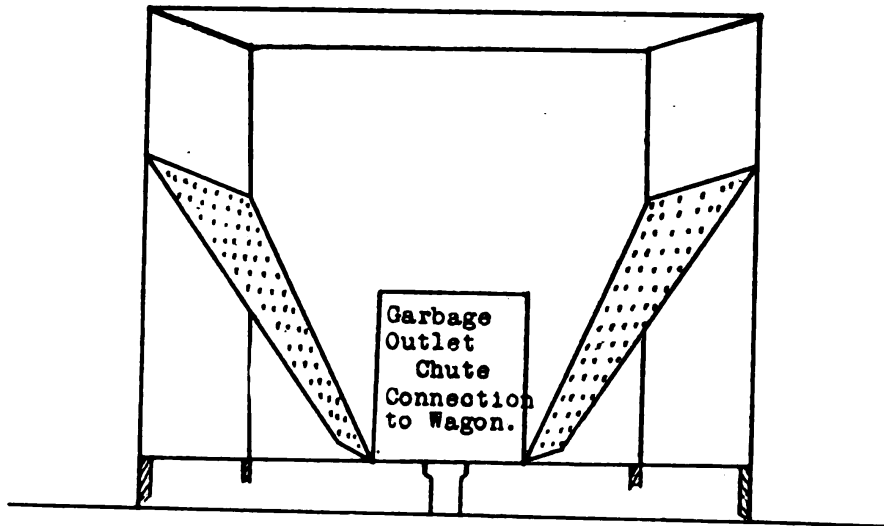
On the outer side of this tank is a slop chute, and well-fitted door. When raised, permits the contents to slide into the garbage collecting cart backed under it.

While a door properly installed will not permit a seepage of liquids, it is advisable to have a slight perforated depression in the chute bed immediately outside the door, and this depression connected by pipe with grease trap and drains. The bottom of the outer shell slopes towards a center drain, and in the sides are two handhole openings.

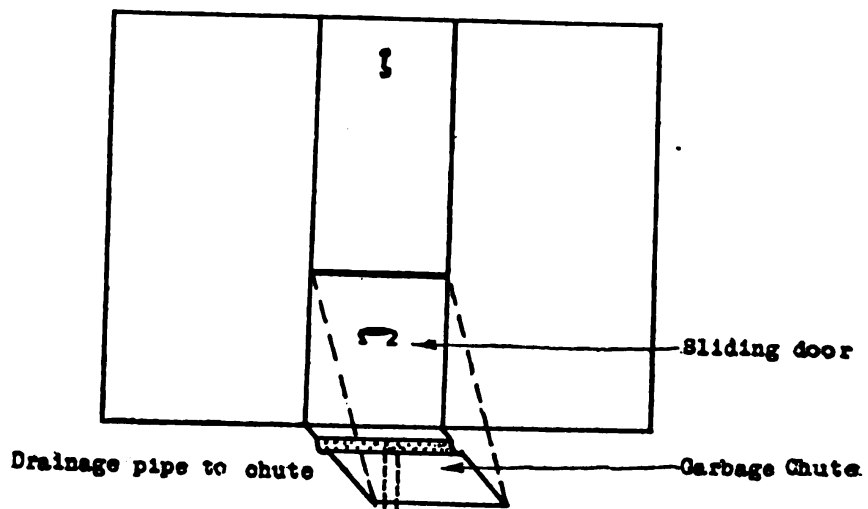
Within this outer shell is a sloping perforated partition, on the top of which the garbage rests, and through the many holes of which the liquid portion drains away, to the sloping bottom of the tank, and thence to the grease trap and sewer.

The accompanying illustrations explain this installation, which has proved to be an entire success.

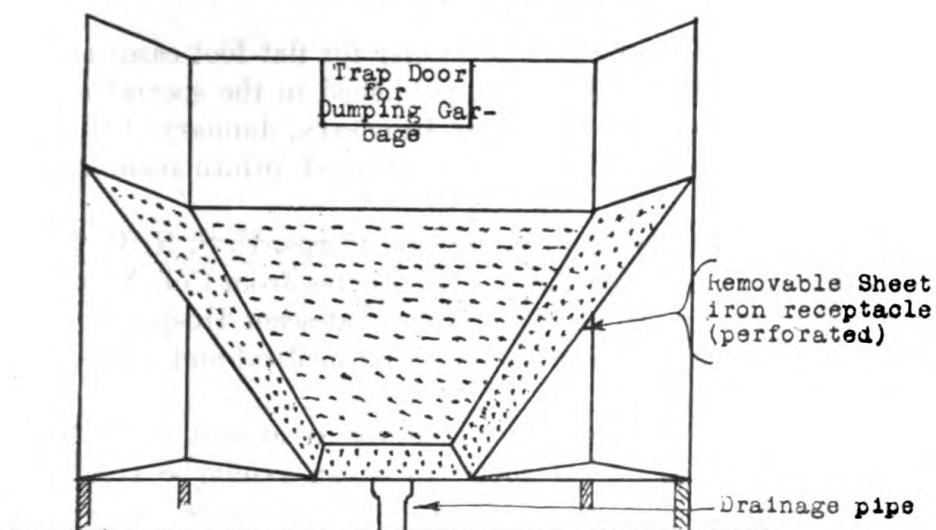
Front view, Garbage tank (Sectional)



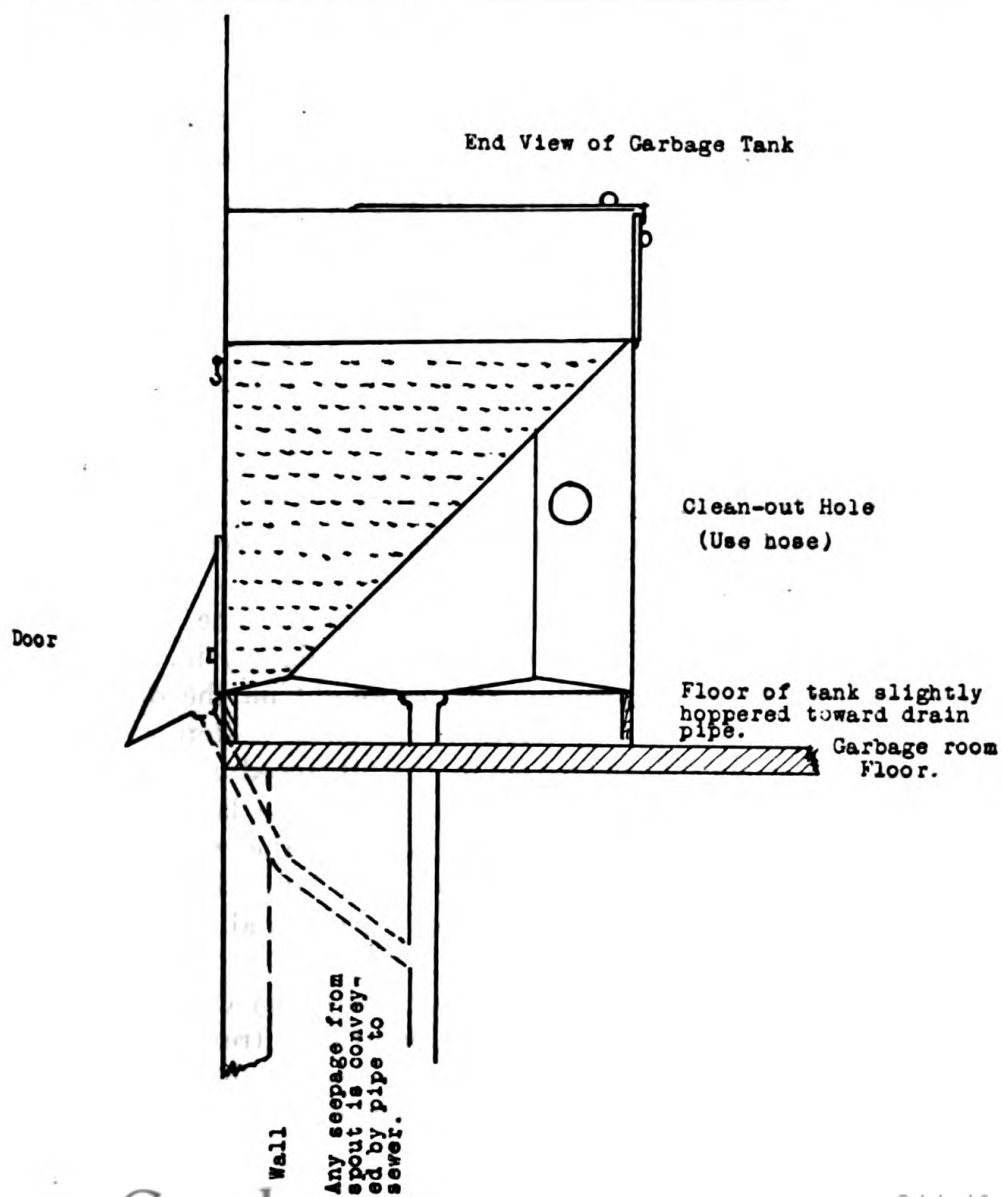
Front View of Tank



Rear View, Garbage Tank (Sectional)



End View of Garbage Tank



THE FLAT-FOOT LADDER.

The brief allusion to the Barron ladder for flat-foot cases and the diagram outlining its construction, published in the special number of the United States NAVAL MEDICAL BULLETIN, January, 1919, have brought numerous requests for more detailed information on this subject.

Commander W. S. Bainbridge, Medical Corps, U. S. N. R. F., has procured the accompanying diagram and notes from Col. Netterville Barron, commanding officer, Military Convalescent Hospital, Blackpool, England, to supplement his report on medical and surgical developments of the war.

"It should be remembered that ladder treatment is only applicable to those cases of flat foot which can safely be treated by exercise. As Sir Robert Jones has pointed out, severe cases of flat foot require possibly operation and certainly rest with continuous support of the arch by building up the boot by properly proportioned pads. However, the vast majority of flat feet should be got in the early stages and treated by means of the ladder. It should also be noted that many feet *look* flat and indeed *are* flat, with a practical absence of arch, which do not present any symptoms and do not interfere with exercise. Policemen often have feet of this type.

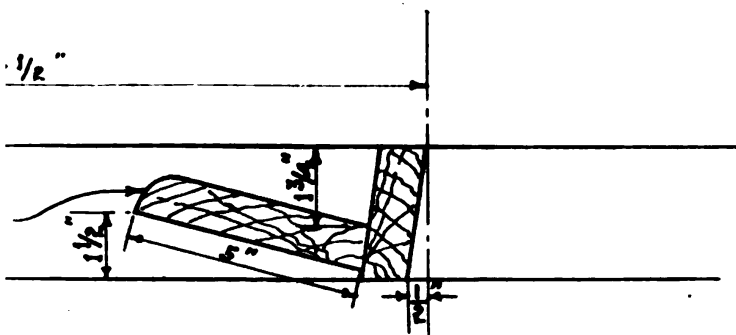
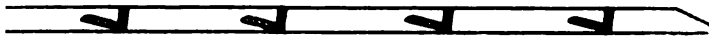
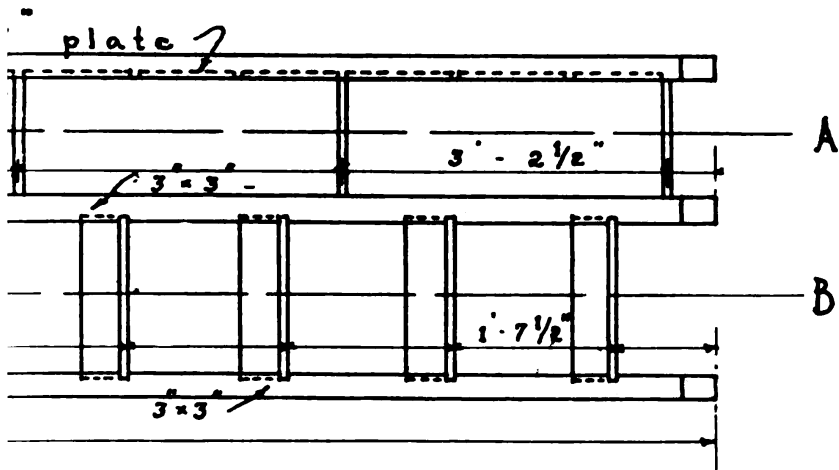
"The ladder itself is a ladder laid flat on the floor which instead of the ordinary rungs has steps set at an angle of approximately 35° and provided with a toe piece to prevent the foot slipping forward off the steps. The toe piece should be about 1½ inches deep and the step 3 to 4 inches.

"There should be an interval of 18 inches between each step; the whole ladder should be some 20 to 25 feet long. Running along the side of the ladder is a balancing board, on which the set exercises are finished off.

"The important thing is how the exercises are done.

"The patient must step on the ladder, toes slightly in. He then points one foot forward, keeping all the weight on the other foot until the advancing foot is in position on the next step. He then sways the whole body forward on to the advanced foot and continues as before. Having reached the end of the ladder he does exactly the same backward, this time keeping the weight on the front foot while the retiring foot is in position. It is this feeling of position which does the good as it brings into action all those muscles which go to strengthen the arch.

"It will be found that at first the movements may cause a certain amount of pain, in which case the duration of each treatment should be limited to a few minutes. Having exercised on the steps for 10 to 20 minutes, the patient then goes backward and forward twice



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or three times on the balancing board, employing the same sort of movements (i. e., the swaying of the body forward or backward, as the case may be). It is well to have a handrail by the side of the ladder (a wall will do) for beginners. Afterwards the exercises should be done with the hands on the hips and the shoulders pressed downward and backward. After the exercise the patient should rub his ankles and feet, using a little oil. Exercise twice daily, and as recovery takes place employ the usual flat-foot exercises also, and dancing in moderation is recommended. Exercises should be done in stocking feet or while wearing gymnasium shoes.

“Note that the taking of impressions to record progress is a very tricky business. It is easy to show an entirely fictitious record. A paste of whitening (chalk) on which the foot is first placed before being impressed on black paper is what we used. The attendant should press firmly on the patient's shoulders and see that he is not ‘curling’ up his feet in order to get a good impression.”



Fig. 1.—Suggestive narrowing at the wrists and increased width above, due to exostoses.

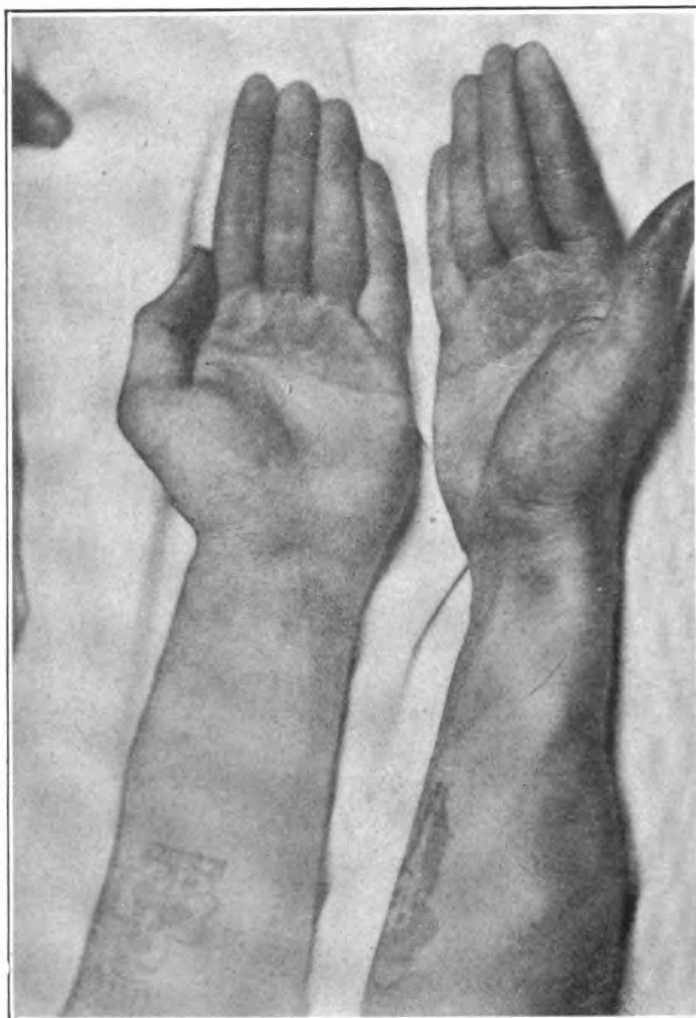


Fig. 2.—Change of contour suggests exostoses.

CLINICAL NOTES.

A CASE OF CHONDRODYSPLASIA WITH MULTIPLE EXOSTOSES.

By R. W. HUTCHINSON, Lieutenant, Medical Corps, United States Navy.

This case appears to be of enough interest to report upon especially as there has been a certain amount of literature upon the subject in the past few years. An article upon "Familial deforming chondrodysplasia with multiple exostoses," by Gorsling was published in the June number of the American Journal of Roentgenology. There was also an article in the Journal of the American Medical Association of February 17, 1917, by Dr. Ehrenfried, of Boston, reporting a number of cases.

Cases showing one or two exostoses have been seen at this hospital quite often, but this is the first case which has shown such widespread deformity and so many exostoses. The exostoses, according to MacCallum's Textbook of Pathology, appear about the epiphyses and are left along the shaft as the bone grows. At first cartilaginous, they soon become bony. They may fuse and limit the motion of the extremities. There appears to be a hereditary element.

The history briefly is as follows: The patient was admitted to the United States Naval Hospital, Newport, R. I., June, 1919, from the U. S. S. *Dixie* complaining chiefly of pain in the ankle upon continued walking.

Family history.—Father and mother living and in good health. One sister died several years ago; cause of death unknown, but said to have died from some bone disease. One brother, according to father's statement, has slight deformities of the wrist and ankles very similar to the patient under observation. The father also states that "all members of my family so far as I can remember have had very bony wrists and ankles." Such evidence, of course, is not conclusive, but we are unable to obtain anything more definite.

Past history.—The patient states that he was thought to have tuberculosis of the ankle while a child. Some deformity of both ankles had been observed during childhood.

Present history.—During the past six months the patient has noticed that his ankle pains him greatly after a long walk or continued drilling.

X-ray examination of the patient shows deformity of many of the long bones, and of some of the flat bones of the body. Exostoses are present around many of the joints, including wrists, shoulders, knees, and ankles. The exostoses are of the spur variety and of fairly dense bone. It will be seen that they are not of the large cauliflower shape, which would greatly deform the patient and also make the diagnosis easy. When the patient applied for enlistment into the Navy a superficial examination by the medical officer would have revealed the deformities of the wrists. The illustrations, figures 1 and 2, do not adequately show the deformities, although the narrowing at the wrists and increase in width just above the wrists, is suggestive. Palpation of the wrists would have shown certain structural peculiarities to be present. In addition, the patient is manifestly inferior in physical development and should never have been accepted.

The right radius, figure 3, is somewhat more shortened than it normally should be and carries practically all the articulation of the wrist as the ulna is too short to enter into its usual relationship. The right ulna is deformed at its distal end and has only a suggestion of a styloid process. The distal end is also greatly thickened and unequal in density.

The left radius and ulna, figure 4, more nearly approach the normal, there being, however, the same thickening and deformities present as on the right side, but to a lesser degree. The styloid of the ulna of this wrist shows but little deformity. Many small spines appear upon the carpals and metacarpals. Most of these spines point away from the nearest joint.

The shoulders, figures 5 and 6, present many interesting features. The left humerus is very irregular in its outline. Its neck is markedly thickened with a spur pointing posteriorly toward the scapula. The external border is very irregular and shows an area of apparent calcium absorption. The left scapula presents many exostoses on both borders and upon the acromion process. A bridge of bone extends from the superior internal angle to the coracoid process. The right shoulder presents much the same appearance. The humerus shows greater thickening and the scapula is partially fixed by bony connections between it and several of the upper ribs.

The knees, figures 7 and 8, show many exostoses, most of them pointing away from the joint, and an uneven deposition of bone in the tibia and fibula on one side.

The left ankle, figures 9 and 10, presents deformity of the lower ends of the tibia, and fibula, and partial union of the two. The right ankle, figures 11 and 12, shows very nearly the same deformity. It was on account of pain in this ankle that the patient was admitted to the hospital.



Fig. 3.—Shortening of right radius and deformity of ulna.

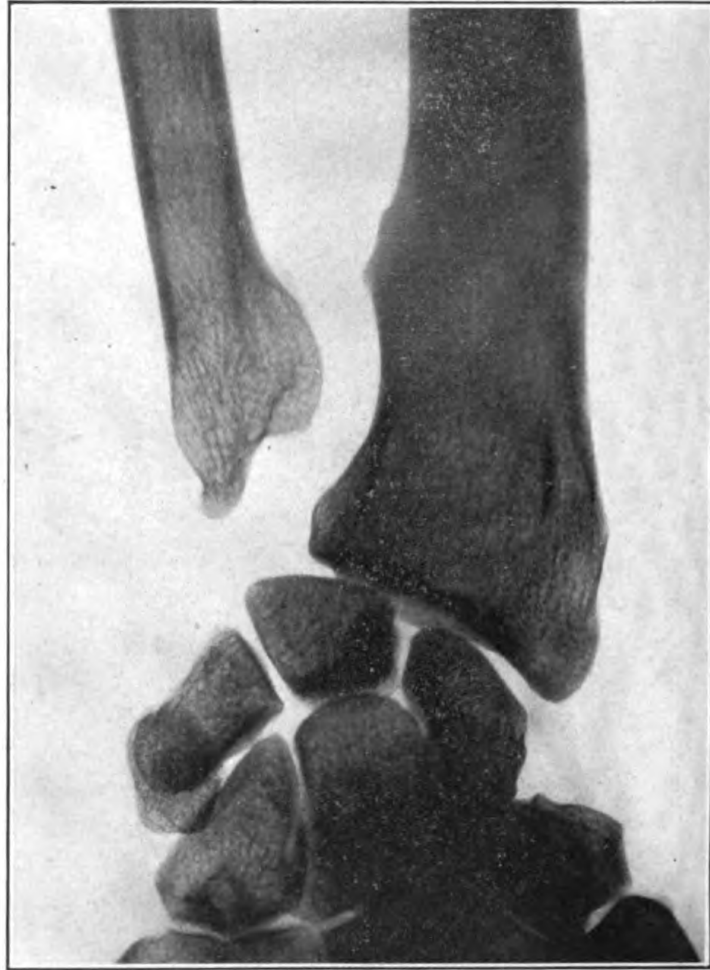


Fig. 4.—Similar but less marked changes in left radius and ulna.
Spines on the carpal bones are numerous.

244-2

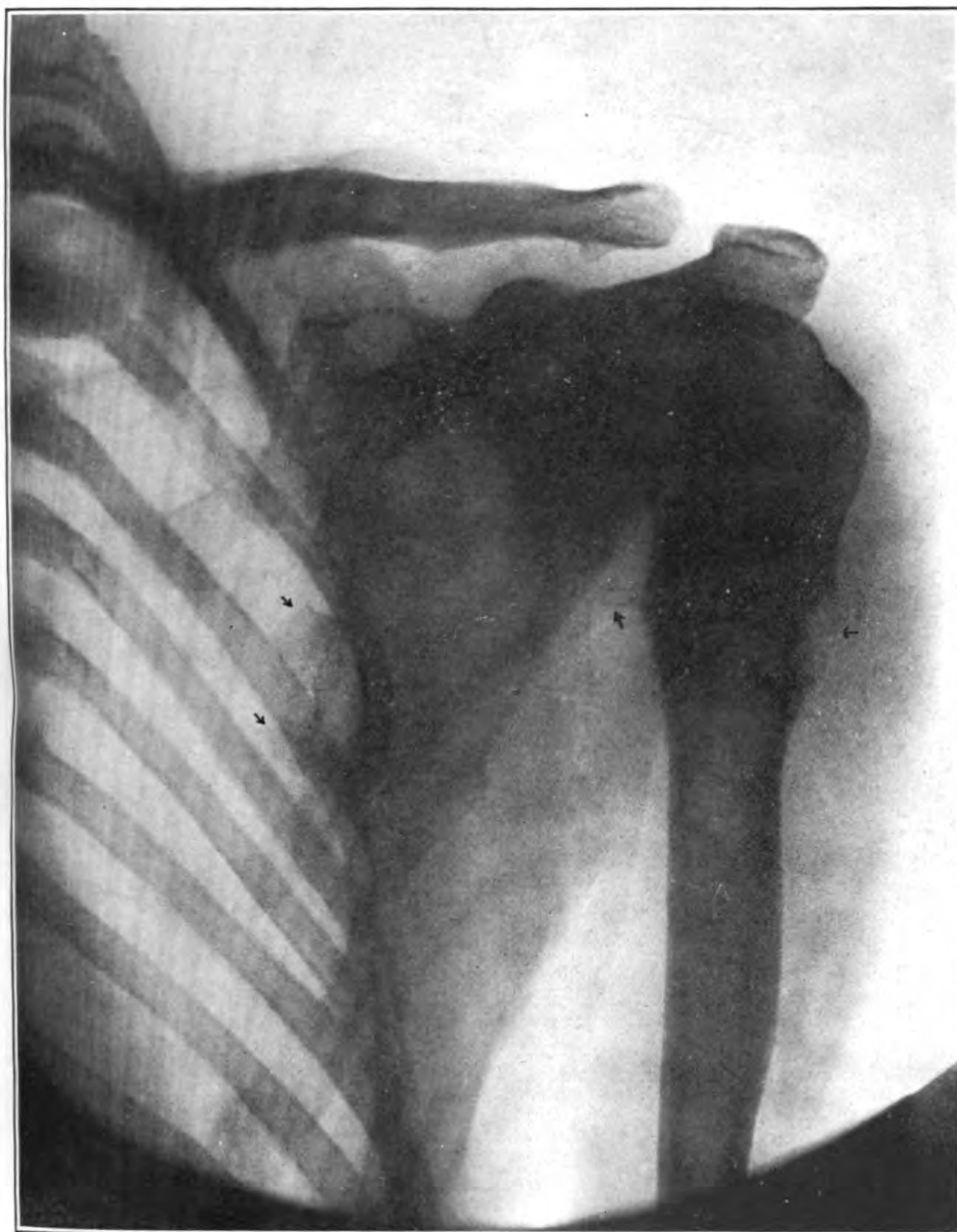


Fig. 5.—Left shoulder. Note irregular outline of humerus, absorption on external border, and spur at neck pointing backward. Exostoses on borders of scapula.

244-3

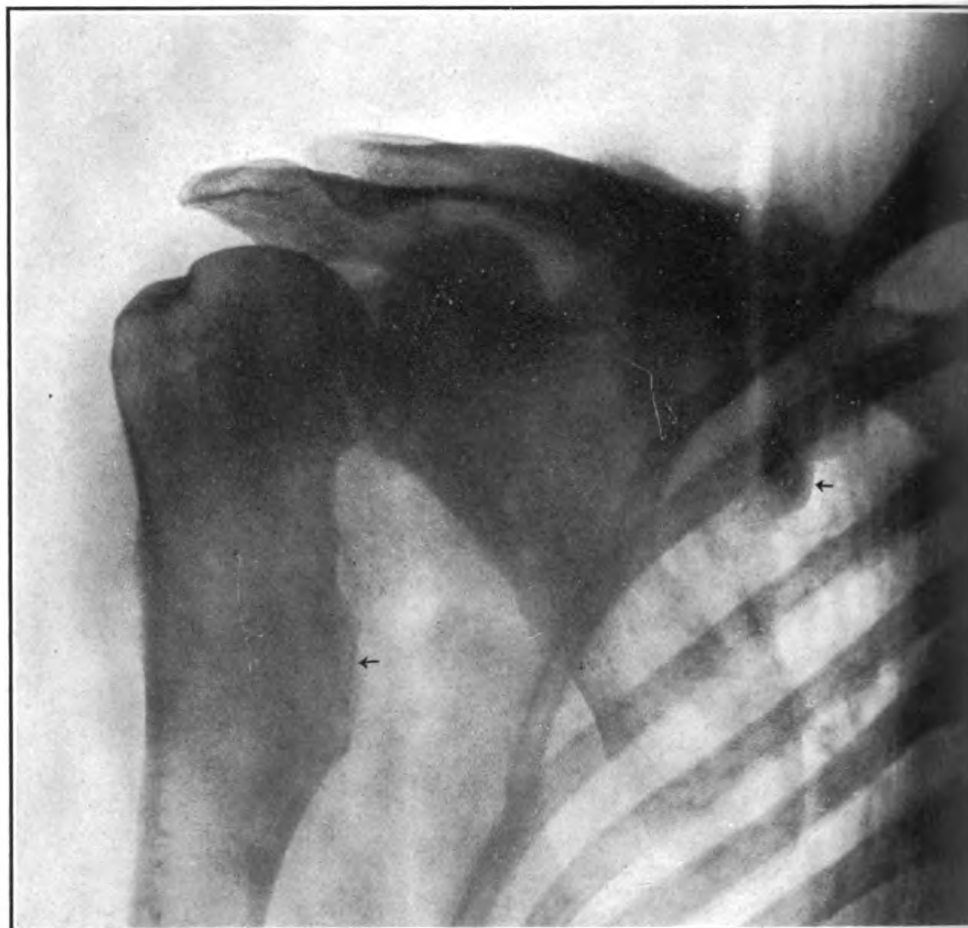


Fig. 6.—Thickening of right humerus and exostoses. The scapula is partially fixed to humerus and ribs by bony growths.

244-4

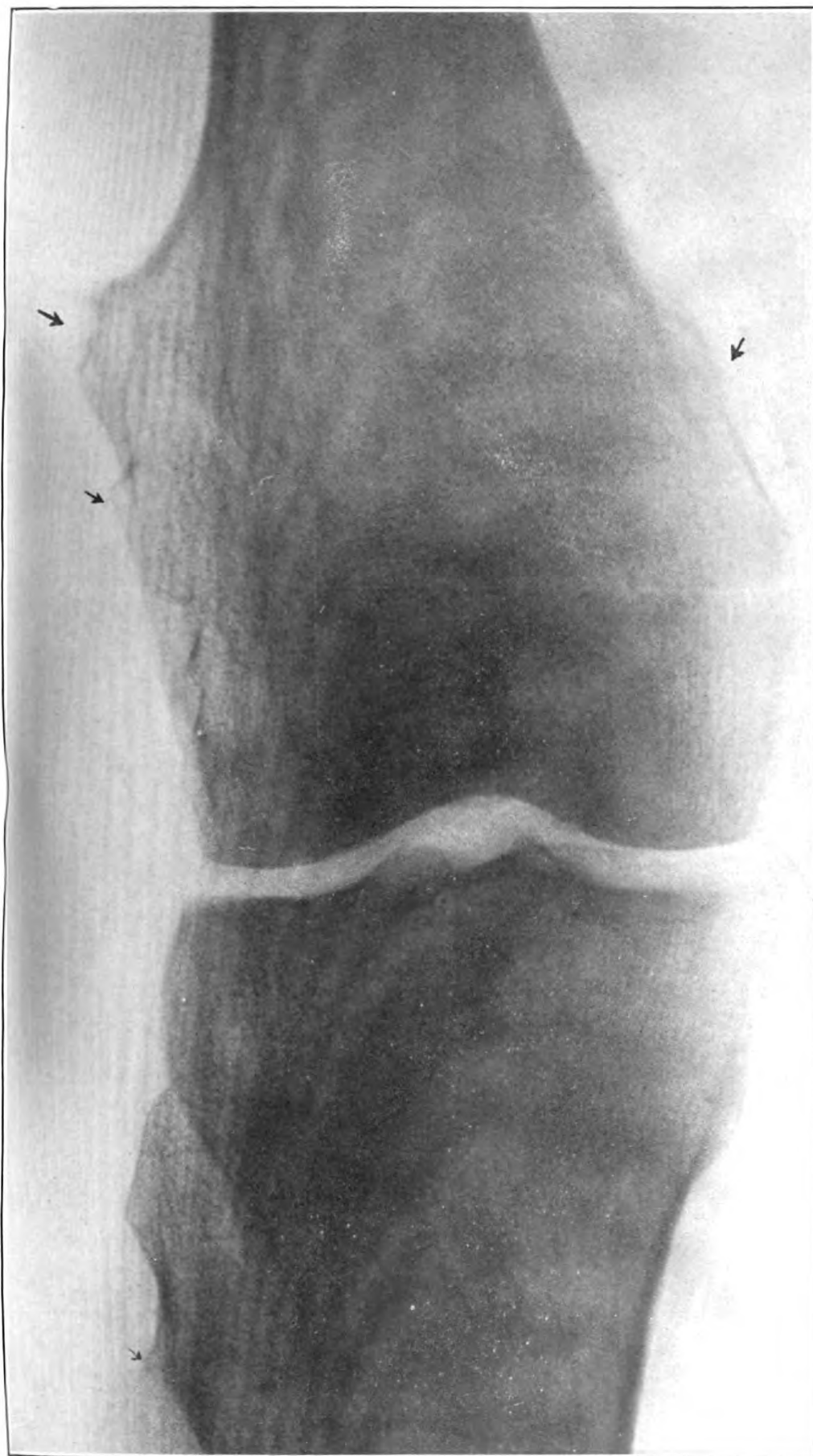




Fig. 8—Left knee. Exostoses of femur and abnormal bone in tibia and fibula. Original from HARVARD UNIVERSITY



Fig. 9.—Left ankle. Lateral view. Deformity and partial union of tibia and fibula.

244-7

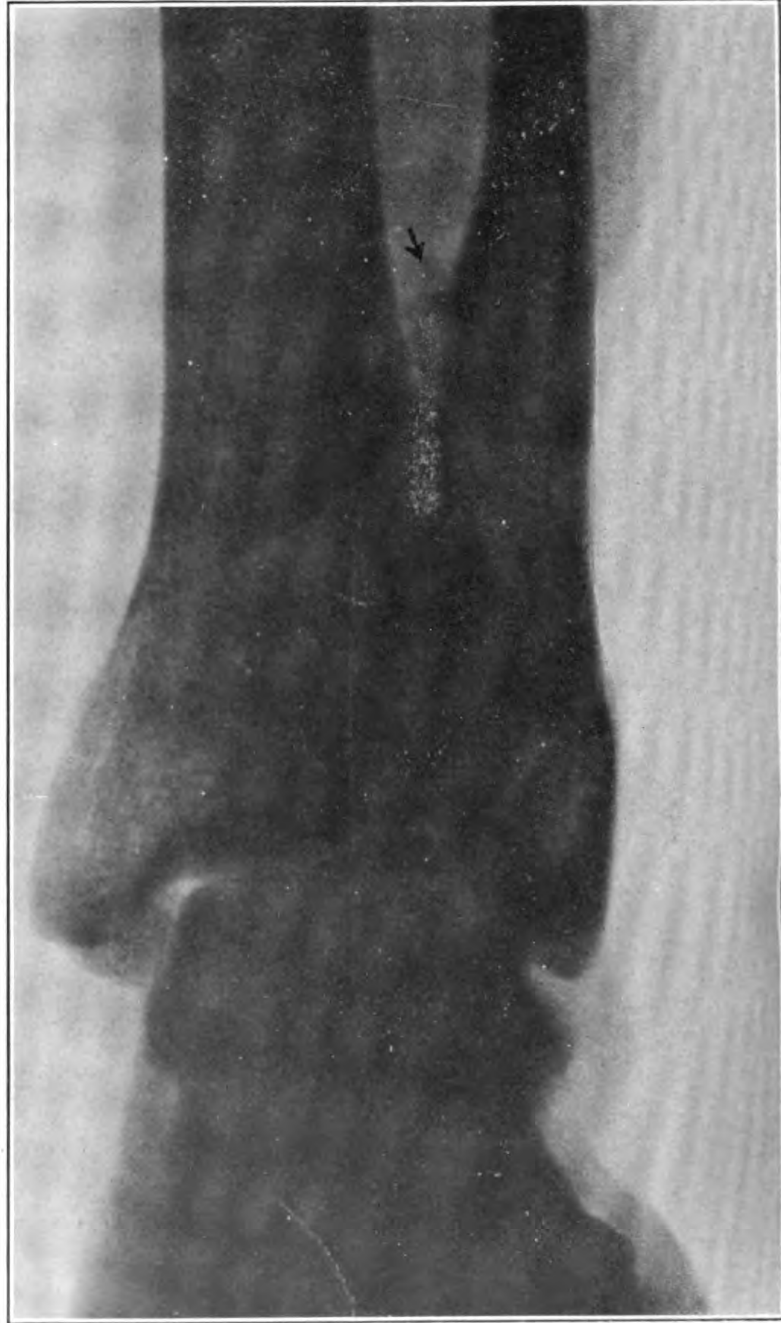


Fig. 10.—Left ankle. Anteroposterior view.

244-8



Fig. 11.—Right ankle. Lateral view.

244-9

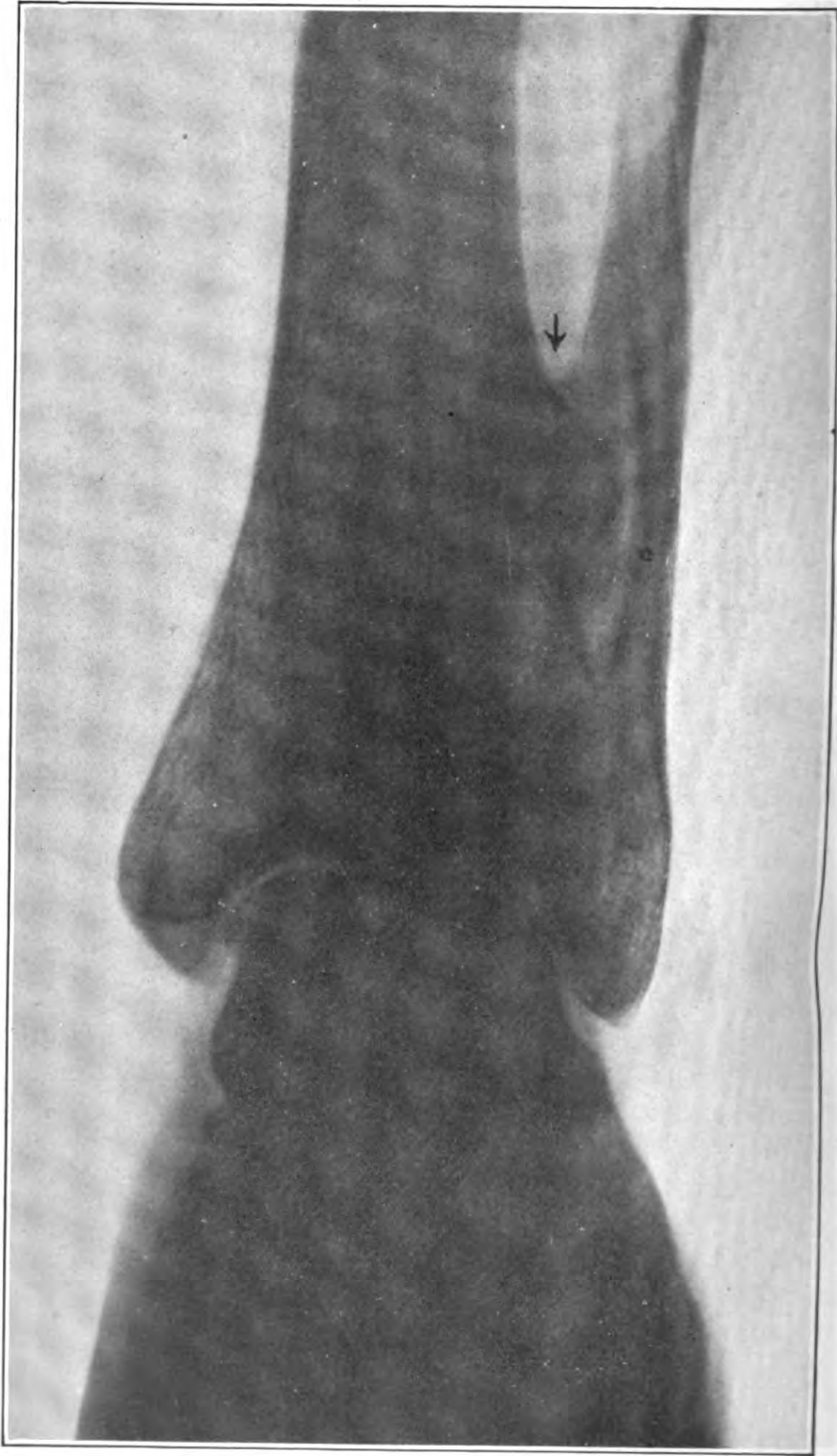


Fig. 12.—Right ankle. Anteroposterior view.

244-10

While on duty at the naval hospital, it has been our privilege to examine by roentgenogram practically all cases admitted with abnormalities of the skeleton. This is the first case of its type to be admitted.

CONCLUSIONS.

1. That the condition is a definite pathological entity.
2. That the exostoses and deformities occurring together are the result of defective epiphyseal development.
3. That the condition has a tendency to be familial if not hereditary.
4. That it occurs bilaterally. If present in one joint, it is usually present in the corresponding joint on the opposite side.
5. That the long bones of the extremities are the most common bones to be affected.

A CASE OF VASCULAR SYPHILIS.¹

By A. E. KUHLMANN, Lieutenant, Medical Corps, United States Navy, and C. C. AMMERMAN, Lieutenant Commander, Medical Corps, United States Naval Reserve Force.

REPORT FROM THE U. S. S. CALAMARES.

(C. C. A.)

The following account of illness and death of a man from this vessel is considered to be of interest:

C. F. O., seaman, was infected with syphilis during the summer of 1917 while at the Newport training station, and received the usual routine treatment with salvarsan, mercury, etc., and was later restored to duty and sent to sea. In March, 1919, he was attached to this vessel. Although presenting absolutely no clinical evidences of disease, he was sent to the United States Naval Hospital, Brooklyn, N. Y., for a Wassermann test as a routine measure on account of his history. Upon receipt of the report (4 plus) he was immediately transferred to said hospital for treatment, where he was given many injections of salvarsan, alternating with various other regular forms of treatment. He remained there under treatment for 66 days, when he was transferred back to this ship as fit for duty on or about May 15, 1919. He was placed on mercury protoiodide grs. $\frac{1}{4}$ t. i. d. which was kept up. About once each week he was questioned and examined, and up to the beginning of his last illness he presented no clinical evidences of syphilis and was not a visitor to sick bay, dispensary, or sick call.

On July 20, the day previous to our arrival in the port of Brest, he was again called up and examined, at which time he seemed and

¹The writers did not collaborate in the preparation of this paper, but their separate reports have been combined by the editor to give the full picture of a remarkable case.

looked well, and stated: "I never felt better in my life, and guess I didn't get syphilis." On July 22 he accompanied a party of 100 men from this ship to Paris on four days' leave, returning on time and in good condition, although reports are that he was drinking heavily in Paris. After his return he did not attend any sick calls until the afternoon of July 28, when he sent for the medical officer. Following is a memorandum report made by Lieutenant (J. G.) F. E. Tierney, Medical Corps, U. S. N. R. F., who treated and transferred him to hospital: "Partial paralysis of left leg, arm, and face. Knee jerk on that side increased. Patient's mental attitude very sluggish; no other symptoms. Has felt perfectly well until yesterday, when he awoke after sleeping on deck in the shade, and acted somewhat irrationally. He was dizzy, and the left leg and arm felt 'queer.' Examination shows what is apparently a paralysis of extensor muscles of left hand, causing fingers to assume a clutching position. The left foot is extended (ankle drop). Apparently he can not readily recognize cutaneous stimuli (pin pricks, etc.), but I am not sure as to whether this is due to loss of sensation or sluggish mental attitude. Pulse, temperature, and respirations normal. No other neurological or general symptoms seen."

On July 29 his condition was about the same, but patient said he felt better. In the afternoon he became irrational, delirious, and then maniacal, gradually passing into coma. On July 30 the patient still comatose, was transferred to United States Navy Base Hospital No. 5, Brest, France. A report from the hospital just before sailing time states that he died about 2.30 a. m., August 2, 1919.

The items of particular interest in the case are: (1) That the processes of the disease were apparently little, if at all delayed or prevented by the administration of all antiluetics; (2) that a person with the pathological condition shown at autopsy could have been apparently well and without symptoms or signs until about 72 hours before death.

REPORT FROM THE UNITED STATES NAVY BASE HOSPITAL NO. 5.
BREST, FRANCE.

(A. E. K.)

On July 30, 1919, C. F. O., seaman, aged 25, was admitted to this hospital with the following history:

Onset.—Some 48 hours ago, upon awakening from a short nap, the patient appreciated a sense of weakness in the left arm and leg. At the same time his shipmates noticed a change in his mental condition. He became excitable, spoke and acted incoherently, and at times appeared drowsy. Within 36 hours the weakness of the arm

and leg had developed into paralysis and marked stupor had supervened.

Past history.—Syphilis was acquired two years ago. The primary lesion was on the genitals. Wassermann 4 plus. Six months later he developed symptoms of cerebral gumma, from which he rapidly recovered following the institution of vigorous antisyphilitic treatment. He has been in good general health until the onset of the present illness.

Present illness.—When admitted to the hospital two days after the onset, the condition was as follows: Coma; flaccid paralysis of left arm and left side of the face; spastic paralysis of the left leg; spasticity and automatic movements of right arm and leg; incontinence of urine; small but equal and active pupils. There was no rigidity of the neck nor of the trunk and no ocular paralysis. No skin eruption. Retinoscopic examination negative. Urine, trace of albumin, many granular casts. Blood pressure, 125. Temperature, 101°. Pulse, 120 and regular. Respiration, 22 and regular. Lumbar puncture showed clear fluid, normal pressure, lymphocytes 50, marked globulin reaction, 4 plus Wassermann.

Diagnosis.—The three diagnoses considered were, first, cerebrospinal fever; second, cerebral syphilis; third, acute polioencephalomyelitis. The first and third were ruled out. Of the several types of cerebral syphilis, namely, (a) parenchymatous, (b) diffuse meningitic, (c) gummatous, (d) endarteritic, the last was selected and a diagnosis of thrombosis, probably of the right lenticulo-striate artery was made. This diagnosis was arrived at because the absence of prodromes, the fulminant onset, and the widespread paralysis could be accounted for in no other way but by a gross subcortical lesion of rapid progression.

Progress.—On the following day, fourth, the coma had deepened, the temperature had risen to 103°, the entire left side had become involved in a flaccid paralysis, and the spasticity and automatic movements of the right side had ceased. The general condition had become much worse. On the fifth day the patient had become moribund, complete general flaccidity had developed, the temperature had risen to 105° and the pulse to 150. On the morning of the sixth day death occurred.

Autopsy.—General findings: Cirrhosis of the liver, splenitis and perisplenitis, atheromata of ascending aorta and hypostatic congestion of lungs. The cerebral findings will be described in detail because of their bearing upon the value of therapeutic measures.

The dura was normal. The pia-arachnoid appeared generally thickened throughout, not more marked at the base than on the convexity. The region of the optic chiasm revealed no evidence of marked previous gummatous infiltration. This was contrary to

what was expected, in view of the symptoms from which the patient had suffered one and a half years ago. The cause of the present illness, however, was easily discerned. The entire anterior two-thirds of the right cerebral hemisphere including the basal ganglia, were softened, anemic, edematous and hemoglobin-stained. The markings were almost wholly obliterated. These lesions were apparently the result of a gigantic infarction, the basal ganglia having suffered most as they were found to be in a state of advanced disintegration. The arterial supply at the base was then carefully investigated. At the junction of the anterior and middle cerebral arteries on the right side a marked increase in caliber and consistency was noted, extending approximately eight millimeters along each vessel from the point of their junction. The vessels in this region were whitish, hard, almost cartilaginous to the touch. The area thus deprived of its blood supply was enormous, embracing all of that portion of the brain supplied by the right middle and anterior cerebral vessels, viz: the entire right frontal lobe, the greater part of the parietal lobe, the caudate and lenticular nuclei, the internal capsule and part of the optic thalamus. A study of the microscopic lesions was most illuminating. Sections were taken through the thrombosed vessel and through other large vessels. All of these showed a subendothelial connective tissue proliferation and more or less round celled infiltration, the process varying greatly in degree at different sites. The smaller vessels such as those of the pia and the intracerebral capillaries were unaffected. The most marked changes were found in the right middle and anterior cerebrals. In these vessels, in addition to a general thickening of the intima rendering the vessel wall about twice its normal thickness, there was an enormous heaping up of cells at various isolated points. In the middle cerebral, upon one of these hillocks as a nidus, a large thrombus, obliterating the entire lumen, had formed. This thrombus was apparently of very recent and rapid formation, as it was homogeneous and consisted only of a mass of fibrin, red blood cells and numerous wandering cells, without the slightest evidence of organization. A very significant fact was the observation that the actual occlusion was the immediate result of an unorganized thrombus and not the result of an encroachment on the vascular lumen by the thickened intima. At no point was the thickening of sufficient degree to destroy more than one-fourth of the vascular lumen and at most points much less than this. No thorough examination of the cerebral parenchyma was made because the necessary stains were not procurable.

The question of salvarsan therapy.—Owing to the fulminant symptoms, it was realized from the beginning that the immediate lesion

was a thrombosis secondary to the syphilitic endarteritic process. This being true, it was realized that salvarsan could in no way influence the lesion. It was therefore withheld. Two other considerations, however, are worthy of mention. It is well known that by far the greater number of fatalities following the routine use of salvarsan are due to the development of an acute cerebral edema or an acute hemorrhagic encephalitis. In an already acutely and grossly damaged cerebral parenchyma, the probability of further destruction by the use of "606" was considered very great. Aside from this consideration, it is known that "606" must be given with great circumspection in cases of aortic aneurysm accompanied by coronary endarteritis. Reasoning by analogy, the danger of the precipitation of a Herxheimer reaction in the cerebral vessels, resulting in an extension of the process, was by no means to be lost sight of. In view of the obvious impossibility of influencing the immediate lesion and the hazard of precipitating these undesirable reactions, salvarsan was considered absolutely contraindicated. The pathological findings confirmed this opinion.

TWO CASES OF ENCEPHALITIS LETHARGICA.

By R. I. LONGABAUGH, Lieutenant Commander, Medical Corps, United States Navy.

Case of C. B. C., 10-29-19. Encephalitis, acute (lethargica). In line of duty. Not due to his own misconduct. Infectious causes. The following previous history is gotten regarding this man from his wife and associates: During the past 10 days he has felt "dopey" and each night extremely tired but says that his work is not any greater than usual. During this period on two nights he complained of sleeplessness and restlessness and walked the floor. On October 26, 1919, while attending a moving-picture show he began to see double and had to close one eye to finish looking at the performance.

On October 27, 1919, he came to sick call and said, "My eyes bother me and I think it due to working under electric light." At this time he did not specifically mention double vision. A rough refraction showed slight error (astigmatism) and I sent him to Dr. R. B. Sweet, U. S. N. R. F. (inactive), of Long Beach, for proper refraction. On October 28, 1919, he did not appear at sick call but, according to associates, spent most of the day in his bunk. On this day he appeared early at the sick bay with a temperature of 100.2 F. and was put to bed. Pulse, 104; R., 28. He complained of double vision and had a transitory external squint in the left eye. Had slight degree of stiffness of muscles of neck and suspicious Kernig sign.

Urine absolutely negative. Blood: Whites, 8,600; Poly., 59; S. I 29; L. L., 7; Trans., 2; Lg. Mon., 3. No malarial parasites; no suspicious cells. Physical examination absolutely negative. Heart normal in size. No adventitious sounds. Lungs normal. Liver not enlarged nor tender. Spleen not enlarged nor palpable. Pupils react to light and accommodation. All reflexes normal. No enlarged glands. Says he feels well but can not keep awake. When awakened answers all questions intelligently and is well oriented. During the day the temperature only reached 100.6 F.

R Enemata. Good results. Had taken a cathartic two days ago. Abdomen negative. Soda bicarb. drachm i, t. i. d.

October 30, 1919. Condition the same as yesterday except that lethargy is deepening. He slept most of the day. Highest recorded temperature, 103 F.; P., 132; R., 34. Physical examination the same. Spinal puncture made. Fluid not under pressure; clear cell count, 10 per cu. mm.; butyric acid negative with 0.2 spinal fluid Fehling's reduced; Wassermann negative; 1 c. c. spinal fluid produced no fixation with one unit complement; stained specimen shows no organisms.

October 31, 1919. Asleep most of the day. Awakened and given food with difficulty because of extreme sleepiness. Enema given; good results. Highest recorded temperature 101.8 F.; P., 144; R., 32. Perspires freely in his sleep. Ice caps on the head constantly.

November 1, 1919. Asleep most of the day. Vitality at low ebb. Highest temperature 105 F.; P., 130; R., 26. Alcohol baths. Ice bag to head. Catheterization necessary. Given enema, good results. Induced to take some liquid food. Fluids pressed. Continued soda bicarb.

Urine shows considerable mucus and a good many renal cells; no albumin; no sugar; telephone consultation with Dr. Ross Moore, nerve specialist, Los Angeles, who believes the condition to be encephalitis lethargica.

November 2, 1919. Asleep most of the day. When awakened answers questions intelligently and is well oriented. Says he "feels better." Is developing a bad sore on one buttock and has developed hemorrhagic bullae on both heels where they rest on the bed. Also developing bullae on toes where covers touch. Highest temperature, 105.8 F.; pulse, 138; respiration, 28. Reflexes have become sluggish but are equal. Nothing further gained through physical examination. Given enema which did not return. Later in the day given eserine gr. $\frac{1}{36}$ by hypodermic which lead to expulsion of bowel contents. Began giving tr. digitalis 0.6 every 3 hours. Keep clean and dry and protect as well as possible. Ice packs p. r. n. for reduction of temperature. Continues to perspire freely. Blood count:

Whites, 13,200; Poly., 65; S. L., 24; L. L., 5; Trans., 5; Eos., 1. General condition very bad. At night given magnesium sulphate, ounces two.

November 3, 1919. Condition more grave. Awakened with great difficulty but when awake is oriented and answers questions well and intelligently. Says he "feels better." Has considerable meteorism. This was relieved through hypodermics of eserine gr. , which caused free bowel movement and passage of much gas. Blood count: Whites, 15,200; Poly., 86; S. L., 7; L. L., 1; Trans., 6.

Reflexes almost abolished. Highest temperature, 103 F., pulse, 112; respiration, 26. Appears slightly better at times. During the evening he waked up and asked for a "ham and egg sandwich and a cup of hot coffee." Continued medication and general nursing as above and gave 1 c. c. pituitary fluid every 4 hours to relieve gas distention.

November 4, 1919. General condition decidedly worse. Physical examination continues negative except for slight stiffness of muscles of back of neck and slight Kernig sign. Seen by Commander Rossiter, Medical Corps, U. S. Navy of the U. S. S. *Idaho*. During this consultation spinal puncture was again done. The fluid was not under pressure, was clear and showed no organisms. Cell count over 300 per cu. mm. Blood: White, 12,600; Poly., 86; S. L., 5; L. L., 2; Trans., 7. Highest temperature, 105.2 F.; pulse, 130; respiration, 28. Ice packs p. r. n. for reduction of temperature.

Lethargy is deepening and it is almost impossible to awaken the patient. He has incontinence of urine and feces. Continued all medication except pituitrin. Meteorism was promptly relieved by hypodermic of eserine gr. 1/30. Abdomen soft following this. Vomited some bilious matter during day.

November 5, 1919. General condition decidedly worse. Could not be awakened at all. Some râles in lungs. Deep reflexes abolished. No Babinsky. Systolic blood pressure only 65 mm. hg. Temperature continued to rise all day and reached 107.2 F. before death, which occurred at 6.13 p. m. in coma.

November 6, 1919. An autopsy was performed this date, and witnessed by Dr. Zeiler, city pathologist of Los Angeles and Dr. Ross Moore, who has seen previous cases of "sleeping sickness." Except for a terminal broncho-pneumonia involving part of the upper lobe of the left lung, all organs and tissues appeared to be absolutely normal. There was nothing found in the gross examination of the brain. We conclude that this man died of encephalitis acute (lethargica) and that brain sections, now being run through will give conclusive proof of this.

November 15, 1919. Gross, as well as microscopical examination of the brain fails to show any abnormality.

Case of J. P. October 1, 1919. Encephalitis, acute. Duty. Incident to service. This man was admitted from the U. S. S. *Vestal* with the following history: Has not been ashore on liberty for more than a month. Did not have influenza last winter but had a very severe "cold," lasting three days, in which he spat blood. Four days before admission he reported at sick call on the U. S. S. *Vestal* complaining of double vision, headache and pains, and pins-and-needles sensation in the right thigh. Was restless and could not sleep. When he did sleep he constantly polished his nails on the bed clothing. Was suspected of hysteria and tubercular meningitis. On admission he is well oriented as to time and place and answers all questions well, but a trifle slowly. Deep reflexes are practically normal throughout, but superficial reflexes are slightly exaggerated. Temperature, 102 F.; pulse, 100; respiration, 24. Falls asleep as soon as permitted and sleeps soundly, always lying on back. Has slight twitching of facial muscles during sleep. When awakened has a transitory internal squint of left eye. Says that he no longer sees double. Urine, negative. Routine blood examination, negative. Pupils, normal.

October 2, 1919. No change in condition. About 30 c. c. of spinal fluid removed and sent to Dr. Zeiler for examination. The fluid was under very slight pressure for the first c. c. or two and then dropped normally. Blood: Reds, 4,800,000; whites, 5,800; Poly., 66; S. L., 32; L. L., 1; urine, negative. Sputum, negative. Temperature 102°; pulse, 96; respiration, 24.

October 3, 1919. No change in general condition. Seen by Dr. Powers, health officer of Los Angeles, who believes the diagnosis to be encephalitis lethargica. Only treatment consists of soda bicarb. one drachm t. i. d. and liquid diet. Bowels and bladder normal. Patient wakens and goes to the toilet himself. Also has an excellent appetite and when aroused to take food complains because there is not more and eats ravenously. Temperature, 102°; pulse, 98; respiration, 24.

October 4, 1919. Cell count 220 per c. mm., mostly mononuclears; butyric acid test negative with .02 c. c. spinal fluid; Fehling's sol. reduced; stain for T. B. negative; Wassermann negative; no fixation produced by 1 c. c. with one unit complement. Dr. Zeiler believes these findings rule out tubercular meningitis and indicate lethargic encephalitis. Seen this date by Dr. Moore, Los Angeles, who believes the diagnosis to be as above. Temperature fell to-day to 99 F.; otherwise no change.

October 10, 1919. Condition has remained unchanged, except that temperature fell to normal, two days ago. To-day he awoke of his own accord at 11.30, ate some candy from his locker, and remained awake for half an hour.

October 11, 1919. Awake from 11.30 a. m. to 1 o'clock.

October 12, 1919. Sat up for half an hour and read part of the newspaper.

October 20, 1919. Has been making steady progress. Is now up and about most of day and takes normal interest in affairs. Soon ready for duty.

November 16, 1919. For the following notes I am indebted to Lieutenant J. C. Ruddock, Medical Corps, U. S. Navy:

"We have no means of judging the previous mentality of this man, but examination at present gives the following:

"*F. H.*—Negative.

"*P. H.*—Negative except for above illness.

"*P. E.*—Well-developed, sleepy-looking young man. Nutrition good. Skull measurements normal. Thyroid slightly palpable. No Stellweg, Von Graafe, or Moebius signs present.

"*Eyes.*—20/20 R. 20/20 L. No astigmatism; slight internal strabismus, left.

"*Ears.*—Hearing extremely acute. Taste normal. Smell normal. Muscle power good.

"*Reflexes.*—Knee jerks, radials, jaw jerk very much exaggerated. Clonus of knee and radials. No pathological reflexes elicited. Marked tremor (fine) of fingers. Dermatographia two plus. Sympathetic system normal. Cutaneous sensibility normal to pain, touch, heat, and cold. Deep muscle sense normal.

"*Speech.*—Slow, drawling, frequent stammering, tendency to slur and mumble. Attention normal.

"*Association.*—Delayed (any word associated with things to eat or wild animals is thought of immediately. All others delayed).

"*Memory.*—Poor (can not remember what he had for breakfast, nor what he did during the day. Can remember only 7 of 9 common objects exposed 60 seconds).

"*Description and report.*—Poor (unable to describe watch or half dollar).

"*Suggestibility.*—Resisting.

"*Emotional.*—Two plus; becomes very nervous during examination and gets a chill in which he shakes all over for several minutes. Very serious about everything and at times becomes very irritable and excited at the hospital corpsmen.

"*Appetite.*—Good.

"*Sleep.*—Abnormal (feels sleepy all the time)."

The Goddard modification of the Binet-Simon tests shows a serial graduation of 12 years. (Present age 18.)

A CASE OF FOREIGN BODY IN THE HEAD.

By L. M. SCHMIDT, Lieutenant Commander, Medical Corps, United States Navy.

J. K., ship fitter in the navy yard, was admitted to hospital June, 1917.

History.—While working on the deck of destroyer at the navy yard, near a C. P. O., who was doing dotter practice with a rifle, the rifle exploded as a result of an overlooked cartridge, and a piece of the rifle struck the patient in the region of the right frontal sinus. Patient was in a stooping position, with his head toward the rifle. He was knocked down, and when picked up there was severe hemorrhage from the wound just below the right frontal sinus. After first aid, he was sent to hospital on a stretcher. On entrance, he objected to any movement of the head or neck, because of pain.

X-ray pictures were immediately taken, and showed a piece of metal about 3 inches long by three-fourth inch wide under the base of the skull. This extended in the lateral view from a position about 1 inch above the posterior border of the hard palate, in a downward and backward direction, to the region of the body of the third cervical vertebra. The antero-posterior view was not a good plate, but showed a dark shadow extending from the mid-line behind the nasal fossae, downward and to the left, the lower portion about $1\frac{1}{2}$ inches from the mid-line.

A finger passed into the nasopharynx felt an iron bar over which the finger could be hooked. The metal was immovable to such force as could be applied.

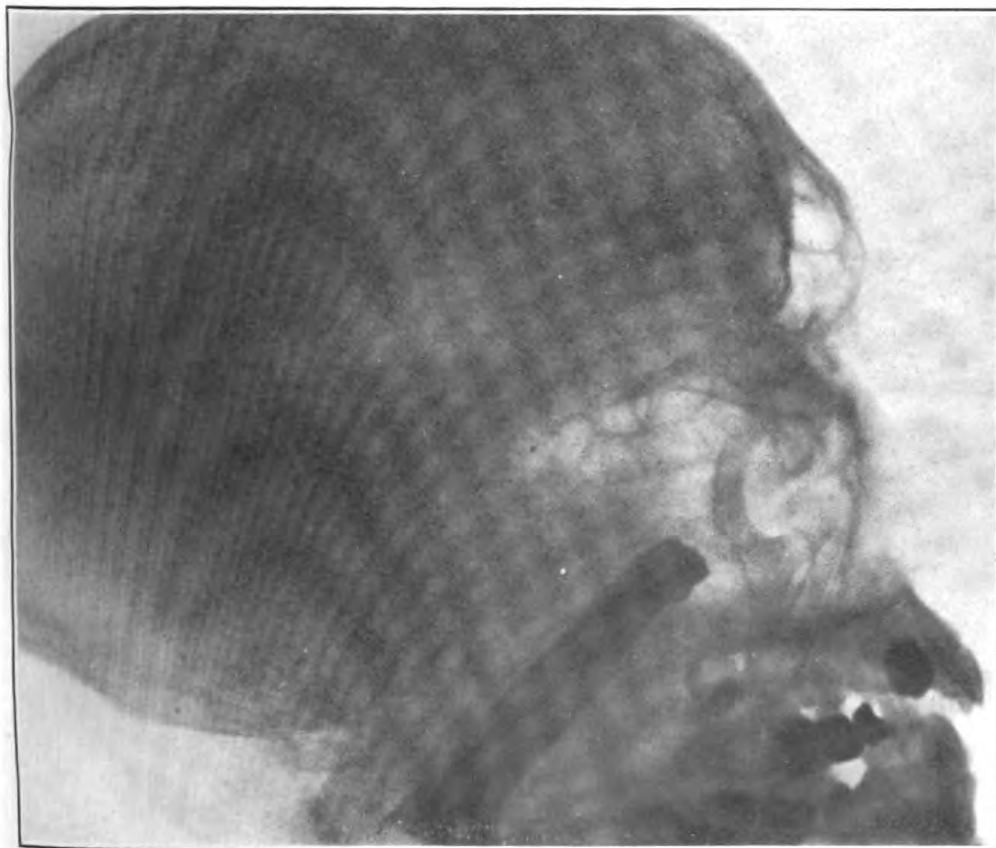
The patient was anesthetized, and an incision made in the left side of the neck, down to the lower end of the foreign body, which was firmly impacted upon the transverse process of the third cervical vertebra. While trying to dislodge the fragment with a forceps, the metal bar slipped forward, out of sight, and the wound instantly filled with blood.

The wound was packed, controlling the hemorrhage, but the patient, who was very lightly anesthetized, immediately expelled large quantities of blood from the mouth and nose. A finger was introduced through the mouth, behind the soft palate and found the foreign body movable, and after a moment it was pushed forward so that the anterior end protruded from the wound just below the right frontal sinus. The foreign body was then easily extracted when it was found to be a portion of a rifle barrel. The edges were like saw teeth. Hemorrhage continued severe for a moment, then gradually subsided, when the patient appeared nearly exsanguinated.

The usual measures were taken to replace body fluids and combat shock, the packing was left in the neck wound and the patient re-



Foreign body in the head. Anteroposterior view.



Foreign body in the head. Lateral view.

He improved slowly. The necking in the neck was

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turned to bed. He improved slowly. The packing in the neck was removed on the third day and convalescence was uneventful. The patient was discharged to work after 27 days in hospital. He later returned with a stenosis of the right lachrymal duct, which was relieved by probing. He was seen one year later and had suffered no ill effects, except from the lachrymal duct.

THE LATE TREATMENT OF WAR OSTEOMYELITIS.

By E. I. SALISBURY, Lieutenant, Medical Corps, United States Reserve Force.

Osteomyelitis has followed in the wake of all wars, but the use of high explosives and the machine gun in this war, with a consequent greater number of bone injuries, has increased proportionately its occurrence.

The number suffering from war osteomyelitis is appalling. Indeed the number of its victims shakes our confidence in what we had come to believe of modern war surgery.

Dr. Pedro Chutro, of Buenos Aires, who has been in France since the beginning of the war, and who is recognized as one of the foremost of war surgeons, reports that there were 75,000 old suppurating bone sinuses in France alone at the close of 1917, the third year of the use of the Carrel-Dakin method. (Chutro lately reports that there were 300,000 of these cases in France at the end of the war.)

When we are informed that some of these persisting sinuses have been operated upon as many as 20 times, each case representing a futile attempt in the treatment of a compound fracture, our doubts seem almost confirmed, and we are on the verge of condemning modern methods, stayed only by the favorable reports of a long list of war surgeons.

The Carrel-Dakin method has its admirers and enthusiasts. The objectors would fall in line with them but for the fact that each has a pet remedy among the chloramines, flavines, and sunlight treatments. It has been held to be the "final" treatment in the war, "the method of choice" and to "approach the ideal." The British surgeon, Sir Thomas English, working with the armies in the East perhaps best qualified his opinion of the Carrel-Dakin method, when he said, "All of these things call for an open mind and no dogmatic utterance."

This should be our approach also to the subject, and it will not require a great deal of pondering to realize that more depends upon the individual surgeon than the method or agent. Without an understanding of the causes, one is apt to discredit debridement and

more particularly the use of the hypochlorite solutions and the Carrell-Dakin treatment.

Chutro, who has been interested in these cases speaks of them as among the tragedies of the war, and says, "Most of them could have been prevented." No doubt that they could, too, for it is my experience that such cases as we receive, have not been adequately explored at the time of primary operations and, therefore, are not properly cleansed mechanically of small bone fragments, pieces of wood, and bits of clothing, etc. Too much stress in the instruction for debridement preceding the Carrel-Dakin treatment is placed upon the retention of small attached bone fragments that they may act as small bone grafts to aid union. Too often these apparently well attached fragments are only hanging to traumatized and devitalized tissues and ultimately act as foreign bodies and sequestra, keeping the wound open. It would be better to sacrifice these for the sake of a clean wound, which would permit of union by callus or later by graft.

Where a sinus persists after reasonable time has been given a wound to heal, it may almost be axiomatically stated that some porous substance has been left within. A piece of cloth, wood, or more commonly, bone is the usual offender. These porous substances shield infected material, and cause a persistence of infection, whereas metal becomes clean and is encysted.

The results here in treatment are well above 90 per cent and the methods from which I have derived most satisfaction both in time and results are briefly as follows: Under anesthetic the patient's wound is opened wide and the granulations and sequestra are curetted away as well as all soft absorbed areas of bone. The wound is carefully explored to see that this procedure is thorough and the wound is packed with plain or iodoform gauze. Subsequent dressings are of gauze packs saturated with Dakin's solution and kept so. If warranted, the Carrell-Dakin method is instituted. When the wounds become clean and fresh granulations cover the bone surface, which occurs usually in 10 days to two weeks, the cavity is obliterated by filling with sterile paste (20 per cent bismuth in petrolatum), and a dry dressing applied. Beneath this sterile dressing cell proliferation takes place in normal time and permits of early and complete granulation of the cavity, while the excess of the paste is extruded.

There is no reason why cures could not be effected in the greater percentage of these cases, and the use of Dakin's solution, or of the Carrell-Dakin method, is undoubtedly of great value, provided the field is properly prepared for its use, and it renders closure more quickly possible.

GAS GANGRENE AT THE UNITED STATES NAVAL HOSPITAL, NORFOLK, VA.

By L. M. SCHMIDT, Lieutenant Commander, Medical Corps, United States Navy.

The following cases are of interest because of their occurrence in the vicinity of Norfolk and Portsmouth, Va.:

Conversation with many physicians in this locality failed to discover any cases within their recollection. While there may have been similar cases in this part of the country, they are at least rare.

Case 1.—G. S. M., Lieutenant (junior grade), United States Naval Reserve Force, admitted to hospital June 20, 1919. History: About three hours before admission, fell in his airplane about 100 feet, upon a concrete aviation field at Newport News. Examination showed fractured internal and external malleoli of right ankle, with foot dislocated forward, and a small open wound over the tendo Achillis same foot. There were many contusions over the entire body. The left knee showed signs of serious injury, and it was later discovered that there was a fracture of the left os calcis. Temperature was normal and pulse 76-78. Under ether the region of the right ankle was examined, and the parts put into, as nearly as possible, their normal position. There was much bruising of the soft tissues, but the wound over the tendo Achillis did not in itself seem serious.

The following day the patient was fairly comfortable, and the wound of the right foot looked clean. Temperature, 100-101.5°; pulse 92-118. There was much yellowish discoloration of both legs from bruises.

On June 27, 1919, two days after admission, patient was restless and vomited once. Pulse remained above 100 and temperature above 101°. Wound still looked clean, and there was no undue reaction in the adjacent soft tissues.

On June 28, 1919, temperature was above 101° by axilla, and the pulse 100-118. There was free discharge from the wound, and on dressing in the evening, bubbles of gas escaped as the wound was being observed. Smears and cultures for gas infection were made: the wound was laid open, and Dakin's solution started.

At 9 a. m., June 29, 1919, the laboratory reported finding the gas bacillus, and there were signs of gas infection well up the leg. At 9.30 a. m., the leg was amputated at the lower third of the thigh, and the stump left open with the usual treatment for gas infection.

There were no further signs of gas infection. The pulse remained below 100; the temperature did not go above 99°, and recovery was uneventful. The stump was sutured on the fourth day after amputation.

In an endeavor to trace the gas infection, it was learned that the patient was wearing at the time of accident, a pair of socks presented to him by his brother, who had previously worn the socks in the

trenches in France. It was impossible to secure the socks, but two other pairs of socks having the same history were cultured for the gas bacillus, with negative results.

Case 2.—C. D., civilian, a navy yard employee at Portsmouth, Va., was admitted to hospital September 16, 1919. History: While switching a car at navy yard, patient had tried to stop a moving car with a piece of wood, when the wood knocked him partly under the car. Two medical officers passing saw the man hanging on to the car with one hand, and holding up his mutilated left foot with the other, while his right thigh and knee was being dragged in front of the car wheel, and from time to time being crushed. He was rescued by stopping the car with its brakes. After applying tourniquets and temporary dressings, he was sent to the hospital. Examination on admission: Patient was in shock. The left foot was crushed and the portion distal to the medio-tarsal joint severed. The right thigh was badly lacerated at the middle and lower third and the knee joint was opened and disorganized. As soon as condition permitted, amputation was done on the left leg, at the lower third, and on the right thigh at the middle third. The stump of the left thigh was left open to a great extent for drainage, and Dakin's irrigation was started at once. The patient's general condition was excellent following amputation.

On September 17, 1919, the temperature was 99.8° in a. m., and 102° at 6 p. m. The pulse rose to about 100 in the afternoon. The patient felt comfortable, and the stump looked satisfactory.

On September 18, 1919, the condition was the same as on the previous day. Antitetanic serum had been given and a culture made from the stump of the right thigh.

September 19, 1919, the laboratory reported gas bacillus from the stump of the right thigh. The patient looked well and felt very well, but crepitation could be felt in the tissues of the right thigh. While handling the stump preparatory to incision and injection of oxygen, patient gasped, cried out, and died instantly. No autopsy was obtained, but it was thought death was due to pulmonary embolism from a thrombus detached from the stump of the right thigh.

The bacteriological work on both cases was done by Lieutenant J. M. McCants, Medical Corps, U. S. Navy, who reported as follows:

Case 1.—A blood-agar plate culture of the wound exudate was grown aerobically, and showed only staphylococci. A smear of the wound exudate stained by Gram's method showed staphylococci and a few large Gram positive bacilli. Stab culture made in glucose agar and grown anaerobically according to Wright's method at 37 C. showed luxuriant growth in 19 hours. Organisms were large Gram positive nonmotile bacilli, some of which showed spores near the center. There was slight bulging of the bacillus in the region of the

spore. Some of the pure culture was emulsified in 2 c. c. of normal saline, and the whole injected into the marginal ear vein of a rabbit. The rabbit was killed in 10 minutes with chloroform, and incubated at 37 C. Within 6 hours the rabbit showed generalized emphysema, and the abdomen was markedly distended. Smears from the liver showed large Gram positive bacilli. Diagnosis: *B. Aerogenes Capsulatus* of Welch. Aerobic and anaerobic cultures from patient's blood were negative.

Case 2.—Smears from the wound showed staphylococci and an occasional large Gram positive bacillus. Aerobic cultures showed only staphylococci. About 0.2 c. c. of exudate was obtained and diluted with about 2 c. c. of normal saline, and the whole injected into the marginal ear vein of a rabbit. The rabbit was killed and incubated as in case 1. Within 10 hours there was no evidence of gas production by inspection or palpation, but at the end of 16 hours, there was marked production of gas, the rabbit being about twice normal size. Smears from the liver showed numerous large Gram positive bacilli. The organisms were nonmotile. A few showed spores. A diagnosis of *B. Aerogenes Capsulatus* of Welch (gas bacillus) was made.

GASTRIC ULCER WITH PERFORATION.

By G. G. HOLLADAY, Lieutenant, Medical Corps, United States Naval Reserve Force.

The following case is of interest because gastric ulcers are relatively uncommon in young men of 18 years and because, in view of rating, a diagnosis of "heat cramps" might have been made but for the leucocyte count, etc.

J. R. E., F-3c, U. S. N., was brought to the sick bay of the U. S. S. *George Washington* on the morning of November 4, 1919. His condition was as follows: In profound shock, with a temperature of 102°, pulse 56, respiration 20, complaining of pains in chest, arms, thighs, and abdomen. He had come off watch in the fireroom at 4 a. m. Examination revealed a tall, rather thin youth of 18 years of age, shocked, and with an abdomen of boardlike rigidity, tender over entirety, markedly so just under the costal margin on left side and in the appendix region, and perhaps more marked in the former place.

Upon being questioned, he stated that some time earlier he had had a pain in the abdomen, which grew worse until he had to come to the sick bay. Pains in other parts of his body were of a cramplike character. He had had about six months ago a somewhat similar attack but nothing like as severe, and since then had always been more or less uncomfortable about his stomach. His discomfort had not seemed particularly connected with eating. He had not had to stay away from his work except part of one day during the first attack.

After the first pain this morning he had vomited once, but did not know if there was any blood in the material rejected, as he had not seen the vomitus.

An enema had been given before I saw the patient, and after a good result he felt better and the abdomen was much softer and seemed less rigid.

A white blood count was made and found to be 16,500. The patient was carefully watched and treated for shock and presently reacted, the temperature rising to 100°, the pulse to 72, and respirations to 22. white blood count to 19,500.

A diagnosis was made of duodenal or gastric ulcer, probably perforated, and an operation decided upon.

An incision was made well up in right rectus. As the peritoneum was opened, much free liquid and plastic lymph was noted. Without much difficulty there was found on the anterior wall of stomach a fair-sized perforation in the center of a large ulcer about 1½ or 2 inches from the pylorus. The perforation was whipped over and a drainage tube inserted.

Patient returned to bed with a pulse of 72 and in fair condition. His convalescence was easy and most uneventful. His greatest pulse rate was 78, the lowest 48.

INTERNAL OPHTHALMOPLEGIA.

By E. E. WOODLAND, Lieutenant Commander, Medical Corps, United States Navy.

This condition is not uncommon in the naval service, as the writer has seen about 10 cases during the past two years, of which 3 representative types have been on this station during the past month. By far the most common type is the unilateral form that is seen following syphilis.

The individual usually comes for treatment with inability to see close objects plainly, photophobia and widely dilated pupil. Sometimes he complains of diplopia and some vertigo on trying to use the two eyes together. There is frequent comment from associates as to the marked size of the pupil, which hastens application for treatment.

Examination of these cases reveals the same condition as that found after the use of a cycloplegic, viz, a widely dilated pupil, which does not react to light or accommodation, although in a few of the cases there may be a sluggish reaction to light. The consensual reaction is absent. Accommodation is usually totally paralyzed. Ophthalmoscopic examination shows nothing abnormal in the retina unless there was some prior lesion or some coincident lesion of retina from syphilis, which is the most frequent cause. Vision, if the fundus

is negative, should show with pin-point opening normal, and can be corrected to normal by lenses for any refractive error that exists for infinity, additional lenses having to be used to allow for accommodation.

The usual causes given for this condition are: 1. Syphilis in tertiary form or associated with syphilis of the central nervous system, as in *tabes* and other progressive forms. In my experience with these cases syphilis has certainly been the most common factor. 2. Association with paralysis following diphtheria. 3. Action of poisons such as mydriatics and especially some of the poisons associated with meat putrefaction. 4. Rarely other toxemias such as influenza and pneumonia. The explanation for the above types is given by assuming that of the several nuclei forming the nucleus of the oculomotor, one or two are devoted to innervation of the sphincter pupillae and ciliary muscle so that they may be involved alone in an endarteritis or in conjunction with other nuclei of the oculomotor or cranial nerves. 5. From contusions of the eye. 6. From increased tension, as in glaucoma. In these latter two, the cause is local and due to lacerations or direct pressure on the nerves of supply within the eye. The prognosis in these cases should be guarded and in the syphilitic types the most intensive treatment often fails to restore function. The prognosis is somewhat better for the toxic and local forms.

The treatment is directed to the causative factor. In the unilateral form, when no return of function takes place after treatment, the correction of refractive error and for accommodation is attended with poor results. The difference in size of the images striking the retina of the two eyes, owing to immobility of the pupil not permitting it to compensate for change of degree of light, causes a cerebral confusion until the patient learns either to associate the two images or else to totally disregard the one from the affected eye. Where there is diplopia with vertigo, the patient prefers to blank off the affected eye until the confusion ceases. Where the condition is bilateral the use of lenses is attended with more success.

CLINICAL CASES.

I.—J. B. W. (*Musc. lc.*) U. S. N., Age, 26.

The family history is negative as to syphilis as far as could be determined. There is no physical evidence of congenital syphilis. He denies infection and no physical proofs are present. There has been no previous illness of important bearing.

He awakened suddenly to find the right side of his face paralyzed but could wrinkle his forehead (seventh nerve paralysis of central type associated with a widely dilated pupil of same side). Accommodation paralyzed. Pupillary reaction sluggish to light with sluggish con-

sensual. Fundus normal. Vision normal after correction of refractive error. At this time, Wassermann test of blood was negative. Spinal fluid Wassermann was negative—cell count, 8. Fehling's reduced. Intensive antisyphilitic treatment was given by use of arsenobenzol (eight injections) and mercury intramuscularly. Within 6 weeks the facial paralysis completely cleared up with no change in the condition of eye. Wassermanns of the blood remained negative. He was returned to duty after being given glasses but when he tried to read his music he would have diplopia and a sense of vertigo unless he blanked off the affected eye.

At the end of three months his eye condition remained the same although mental confusion was less marked. Wassermann of blood now showed plus 2 on repeated tests and he was placed again on syphilitic treatment. He is still unable to get much benefit from his glasses.

It is considered that this case is of specific origin.

II.—K. L. M. (Lieut. U. S. N. R. F.) age 37, has been a seafaring man in the merchant service for 20 years.

Three years ago he had typical infection of syphilis for which he has received a moderate amount of sustained treatment. He had noticed for the past month that the right pupil was dilated and that vision was slightly blurred and that he could not read with the affected eye. His friends frequently commented on the irregularity of his pupils. He had no diplopia or vertigo but had considerable trouble from bright light and had to put his hand over his eye in taking "sights."

Examination showed an immobile, widely dilated pupil which did not respond to light, accommodation or consensual. Accommodation paralyzed. Fundus normal. Practically no refractive error. Wassermann 4 plus.

Intensive antisyphilitic treatment for three months gave a negative blood and spinal fluid but there was no change in the condition of the eye. The patient really suffered very little discomfort and no glasses were given.

III.—M. C. K. (Ch. Btsn. M.), U. S. N. Age 41.

Syphilis was eliminated by the history and all tests. He suffered from a severe attack of influenza during the epidemic, from which he was convalescing about two months. During this period both eyes were weak and he could not read much. He noticed on getting out of bed that the left pupil was ever so much larger than the right and that his vision was very blurred on attempting to read. Moderately bright lights caused his eyes to pain and water, and as there was associated headache he wore dark glasses for a month.

When seen there was some dilatation of left pupil remaining. There was some reaction to light and a little to accommodation. Accommo-

dation was only partially paralyzed. Fundus normal. Symptoms of photophobia and the comments of friends were the disagreeable features.

It is believed that this case was a complication of the influenza and that gradually he will have wholly restored function.

IV.—T. M. T. (P. M.) Age 21. This case was only seen twice and no opportunity for complete study presented itself. History and physical examination negative for syphilis. He had recently had an attack of diphtheria which was shortly followed by diphtheritic paralysis involving the upper and lower extremities. When seen he still was suffering from incoordination of the limbs. He complained of the light and inability to read. Examination showed both pupils semidilated with sluggish reaction to light and accommodation. Accommodation was very weak but not wholly paralyzed. Fundus normal.

The case could not be followed, but it is believed that it was an example of the type following diphtheria.

OPEN TREATMENT OF A FRACTURED METACARPAL BONE.

By R. W. AUERBACH, Lieutenant, Medical Corps, United States Navy.

"Opinions differ regarding this question. For many years the operative treatment of simple fractures of the patella has been practiced. Gradually this effort to secure not only bony union but accurate approximation was extended to the olecranon process and ultimately to all bones. In the development of the tendency to operate on simple fracture the X-ray undoubtedly has played an important part. The skiagraph will often show a marked displacement of a fragment so great, in fact, that one would expect much visible and palpable deformity when inspection, palpation or measurement reveals but little deformity." Some surgeons advise operative interference in every case of simple fracture in which there is considerable displacement of fragments or difficulty in maintaining them in opposition.

J. M. C., seaman, U. S. N., age 18, was, on May 20, 1919, admitted to the sick list of U. S. S. *Princess Matoika* with a diagnosis of fracture of the metacarpal bone of the right index finger (simple) as a result of a fist fight. The fracture was reduced and a roller bandage applied. Six days later he was transferred to the U. S. Naval Hospital, New York, N. Y., at which time his right hand was swollen and tender and the fracture of the second metacarpal bone showed considerable posterior deformity. The splint and dressing were readjusted. On June 10, 1919, three weeks after the injury, the splint was removed and the hand showed less swelling, but marked posterior deformity persisted. The patient was transferred to the

U. S. Naval Hospital, Wards Island, N. Y., June 13, 1919, at which time he was unable to flex his index finger because of deformity and tension of the extensor tendons. A skiagraph taken on June 18, 1919, about one month after the injury showed (figures 1 and 2) fracture of right second metacarpal bone with displacement toward the ulnar side, the lower fragment overlapping. On July 14, 1919, seven weeks after injury, under ether anesthesia an incision $2\frac{1}{2}$ inches long was made on the dorsum of the right hand over the second metacarpal bone, the bone was refractured and the ends of fragments were beveled (figures 3 and 4) so that the beveled surface faced the dorsum in order to correct the deformity. One hole was drilled in each of the two fragments $\frac{1}{4}$ inch from the beveled surface. kangaroo tendon was passed through, the ends of the bones were approximated in good position, and the kangaroo tendon tied. Bleeding was controlled, the tendon sheaths sutured, the wound closed

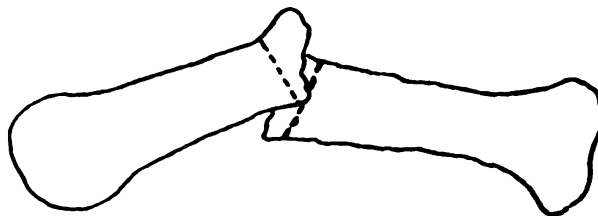


Fig. 3.

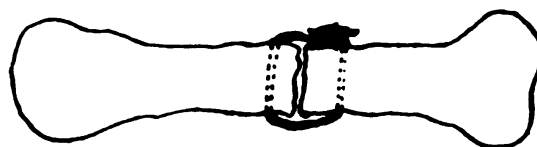


Fig. 4.

and dressed and the hand placed on a board splint. On July 19, 1919, an X-ray picture (figures 5 and 6) showed fragments in good position and on July 23, 1919, the dressing was changed and the skin sutures removed. Gentle massage was begun, followed by passive and active motion until August 7, 1919, when the patient was transferred to the U. S. Naval Hospital, Norfolk, Va., this hospital being placed out of commission.

In our case we had not considerable deformity, as both X-ray and examination showed, but also loss of function. This could be corrected only by refracture when maintainance in proper apposition would have been difficult if not impossible. Therefore open operative treatment was the only choice.

One hole only was drilled because the site was too near the metacarpo-phalangeal joint to warrant too much manipulation or the presence of foreign material injurious to the joint.

Kangaroo tendon was chosen instead of silver or bronze wire because of its greater absorbability and because likely to excite less extensive callus, bone rarification, and nonunion.



Fig. 1.

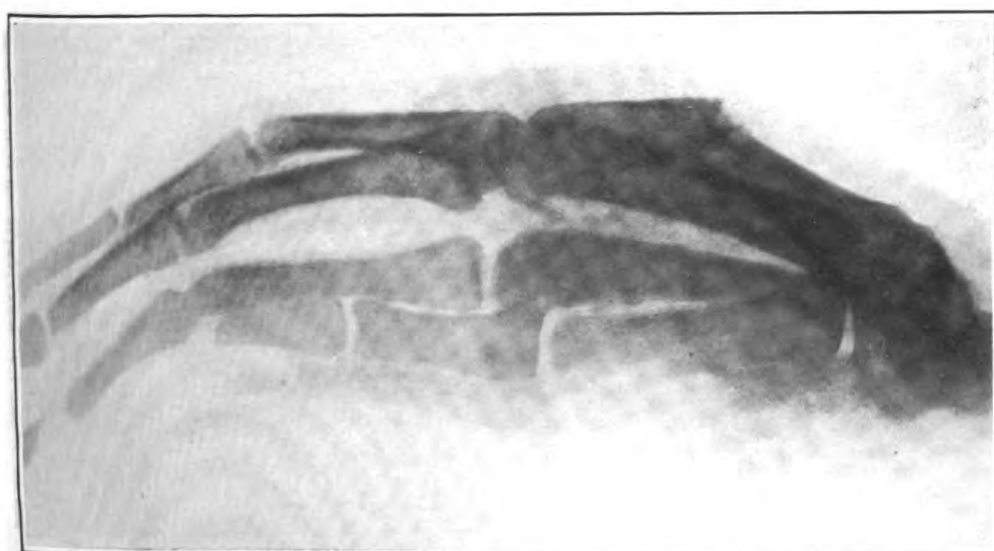


Fig. 2.



Fig. 5.



Fig. 6.

SUPERNUMERARY DISTAL PHALANX OF THE RIGHT THUMB.

By R. S. REEVES, Lieutenant, Medical Corps, United States Naval Reserve Force.

In the course of routine work at the receiving ship barracks, Philadelphia, the anomaly of a supernumerary distal phalanx of the right thumb was discovered. We realize that supernumerary digits are rather common, but only the references given below were found after a most thorough search for such a condition through the literature.

The noteworthy facts in the case are: L. H. H., Sea. age 23, reveals at the distal portion of the right thumb two separate finger nails, about the size of the nail of the normal little finger, with a slight web between them. Measurement of the dorsal surface at the proximal end of the distal phalanx shows that the supernumerary is 1.7 mm. in width while in the left the same measurement is 1.4 mm. The patient is unable to bend the thumb and is therefore lefthanded. Sensation is absolutely normal, as is the functioning power of his right hand. He states that there is no such condition present in his family nor has there been in his ancestors, which is a different feature from other reports of this anomaly as G. F. Barton (1) in an article on "Congenital deformity of both thumbs" states: "Hutchison goes the length of saying that he never has seen a case of supernumerary digits in which there was not a case of inheritance."

Through the courtesy of Lieutenant H. L. Klein, Medical Corps, U. S. N. R. F., the X-ray man at the League Island hospital, I present the cuts taken of both the right and left thumb. His report follows: "There is an accessory thumb on the right hand. This consists only of the terminal phalanx, which articulates with the first phalanx of the right thumb just proximal to and to one side of the articulation of the other terminal phalanx. The first phalanx of the right thumb is only one-sixteenth of an inch broader than the phalanx of the left thumb in its middle, but is one-eighth of an inch broader at its distal articular end. The left or normal thumb has a sesamoid bone at the joint between the distal and proximal phalanges."

In Armandale's "The Malformations, Diseases, and Injuries of the Fingers and Toes and their Surgical Treatment," (2) I found the nearest approach to my case. He describes a case of supernumerary thumb and finger in both hands associated with congenital union and says: "In the right hand the thumb was double, having two metacarpal bones and two sets of phalanges with three distinct nails. * * * The left hand had also a double thumb of the same nature as the right one, but with only two nails." Further on in the same chapter he also states: "Figure 27, plate 3, I took from the hand of

a man aged 50, who had a thumb with one metacarpal bone, but two sets of phalangeal bones which articulated with its distal extremity. These phalangeal bones were intimately united along their whole length, and there were two distinct nails present. The man was a laborer in an iron foundry, and found the thumb quite as useful as an ordinary digit." Windle (3) reports also the following interesting case: "Left hand: The thumb bore on the radial side of its metacarpal bone a supernumerary digit, provided with a well-formed nail, and consisting of two phalanges, provided with movable articulations with one another and with the metacarpal bone. * * * Right hand: * * * the thumb, like that on the other hand, had a metacarpal bone and three phalanges, the articulations between the others being movable." Other cases were reported by Dubreuil-Chambardel (4, 5), Higereiner (6), and Lund (7).

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RUPTURE OF KIDNEY BY TRAUMATISM: NEPHRECTOMY.

By R. R. RICHARDSON, Commander, Medical Corps, United States Navy.

H. W. B., Sea.; age 26 years 11 months; negro; was admitted to the sick list on the U. S. S. *Texas*, July 22, 1919, with "Rupture right kidney, traumatic," "G." (2038), origin; in line of duty. While working on the lower platform of the forward cage mast about 7.30 a. m. he stepped through a hole in the netting and fell about 4 feet, striking the right loin against an iron cross bar or brace. He was not brought to the sick bay or seen by a medical officer until one hour after the accident happened. Examination at that time showed a slight abrasion of the skin in the right flank, just below the lower border of the ribs. Some swelling and tenderness were present in the right flank and side of the abdomen. The pulse was 64 and temperature 95° by mouth. The patient was conscious, with slight evidence of shock. He had vomited and also passed bloody urine.



Right and left thumbs. The right has an accessory phalanx, nail, etc.



Comparison of the two thumbs. The right has two distal phalanges.

The symptoms gradually became more marked until 1.30 p. m., when he was placed on the operating table. Under ether anesthesia and with all aseptic and antiseptic precautions a nephrectomy was done. The patient was on the table from 1.30 to 3.30 p. m., the ship being under way at 12 knots, making passage from Hampton Roads, Va., to the Panama Canal.

The kidney was completely ruptured transversely at the junction of the upper two-thirds with lower one-third; the lower one-third was completely ruptured vertically (in long diameter); the upper two-thirds was incompletely ruptured vertically (in long diameter), the tear extending into the pelvis of the kidney. Blood clots were evacuated, the cavity was flushed out with normal salt solution, a drainage tube was inserted, the wound sutured and dressed, and the patient returned to bed. General condition very good. He was given one-fourth grain morphine sulphate before the operation, and 300 mls of normal salt by hypodermoclysis during the operation and reacted well from the operation.

July 23, 1919.—The patient voluntarily voided bloody urine (200 mls) early in the morning and likewise voided in the afternoon, but there was no blood. The temperature varied between 100° and 101° and the pulse between 96 and 116 during the day. Normal salt solution was given by proctoclysis early in the morning. Morphine sulphate one-fourth grain was administered at 3.15 a. m. and at 11 p. m. Cracked ice and a little liquid were given during the day.

July 24, 1919.—The patient continued to void clear urine voluntarily in a. m. and p. m. He was allowed milk and orange juice ad lib. The wound was redressed and found clean and odorless with serous (slightly blood stained) discharge on the dressings. The temperature was about 100° during the day; the pulse ranged from 90 to 100. The general condition was excellent.

July 25, 1919.—Transferred to Isthmian Canal Commission Hospital, Colon. Temperature, 99°; pulse, 94. General condition excellent.

August 18, 1919.—The patient was discharged from the hospital "well; kidney wound healed."

August 16, 1919.—Report No. 1811, U. S. Naval Medical School Laboratory, Washington, D. C.

"Diagnosis: Kidney rupture, traumatic. Specimen shows marked fetal lobulation. The rupture involves both the pelvis and parenchyma of the kidney.

"Microscopically the tissue not involved by trauma shows many poorly staining, granular cells in both the glomeruli and tubules. The tissue in the region of the rupture is extensively lacerated. In the interstices of the lacerated tissue there is considerable hemorrhage."

MUSTARD GAS AND THE CARDIOVASCULAR SYSTEM.

By W. H. MICHAEL, Lieutenant Commander., Medical Corps, United States Navy.

The well-known classical effect of mustard gas is its inflammatory action on all exposed moist surfaces. This action is first seen about six hours after exposure. At this time there is the beginning of some disorder of the cardiovascular system, which is probably due to the pulmonary symptoms which manifest themselves in every degree from a slight spasmodic cough, with or without vomiting, to a fatal pneumonia.

The cardiovascular symptoms at this time seem to run a parallel course with the pulmonary condition and are probably secondary to the latter. However, the possibility of some direct action of mustard gas, or some ingredient or product, on the heart muscle or its nervous mechanism, has some ground for argument. Such action has been noted, and in fact I have experienced the condition, when exposed to the gas in so dilute a concentration or for such a short period that no bronchitis developed. Nevertheless, for from one to three weeks after such light exposure there was marked tachycardia and considerable dyspnea after slight exertion.

In the milder case manifesting pulmonary symptoms there is, as has been said, a bronchitis with severe spasmodic coughing. On the cardiovascular side there will be tachycardia, dyspnea, tremor, and cyanosis during the ordinary work of a quiet sector or rest billet. These symptoms improve so slowly that it is common for a medical officer to become discouraged and send out a "gassed" case a week or 10 days after exposure to gas.

Whether evacuated or not, the milder case will usually recover and be back to duty in an average of two months. The course of recovery is very much accelerated by a graduated system of exercise such as instituted in the convalescent camps of the American Expeditionary Forces.

Returned to duty, a certain percentage of these cases, and especially those who have had a severe gas bronchitis, will have a relapse of the cardiovascular symptoms. The tremor, too, which might have entirely disappeared becomes visible again. The tachycardia and dyspnea return. Then the case passes through a period of several months in which his condition gradually returns to normal. There may be a heart murmur present but the principal symptoms continue to be tachycardia and dyspnea. However, it is doubtful if there is a true myocardial insufficiency as I have not seen or heard of edema which could be ascribed to this condition alone. Incidentally it must not be forgotten that these cases are often associated with "effort syndrome," the neuroses, and possibly hyperthyroidism may be a factor in their production.

The cause of the condition is difficult to explain. One author seems to think that its etiology is in some way closely related to the equally indefinite etiology of asthma. Indeed the symptoms somewhat resemble asthma. For example, the patient often gives a history of not being able to get his breath at night.

The most probable explanation, in my opinion, is that the primary gas bronchitis causes thickening of the alveolar walls, which thickening is still present when the patient returns to duty after his period in the convalescent camp.

At that time his good heart action and increased respiratory action due to the graduated athletic and breathing exercise are sufficient to overcome the disadvantage of the thickened alveolar walls.

After a period of the irregular stress of active service the unfavorable case looses this reserve power so that there are periods when there is not the normal aeration of the blood in the lungs. The resulting feeling of oppression on perhaps a rather irritable nervous constitution could be conceived as sufficient to cause the symptoms described. The patient begins to feel that he is losing ground, that he will never be well, and draws every sort of mental picture characteristic of the pessimist he now becomes.

The cases fortunately, in spite of the pessimism, do get well, which is probably due to the gradual return of the lung tissue to normal.

A CASE OF ULCER OF THE SIGMOID FLEXURE.

By H. B. COLEMAN, Lieutenant, Medical Corps, United States Navy.

W. E. O., ship's cook second class (23 years previous service), was admitted to this hospital¹ 2 a. m. on August 27, 1919, with a diagnosis of appendicitis, acute. Upon admission, he gave the following history, which corresponded with that written in his health record:

About 9 p. m., that evening, he had been seized with a sudden desire to defecate, and had gone to the head, where he had a copious loose bowel movement, with much straining. Half an hour later, he felt a sudden, severe pain in the lower abdomen, accompanied immediately by violent vomiting, which lasted for about 10 minutes. The pain in his abdomen grew steadily worse. He reported to the sick bay and was immediately transferred to this hospital.

Upon admission here his temperature was 97°; pulse, 84; respirations, 36. He was suffering from acute cramp-like pains in the abdomen. He had not vomited nor had any bowel movement since the one mentioned in previous history. The abdomen was rigid, tenderness on palpation being most marked in left lower quadrant. Leucocyte count, 13,500 white cells; 83 per cent polymorphonuclears. Urine negative. He gave a negative history for previous digestive

¹ U. S. Navy Base Hospital No. 5, Brest, France.

disturbance. Operation seemed to be indicated and preparations were ordered made, but during the interim the patient's condition seemed to improve considerably. In fact the change was so marked that, although the presence of appendicitis, ruptured gastric or duodenal ulcer, intussusception, volvulus, or mesenteric thrombosis was considered, a diagnosis of acute gastroenteritis was considered more probable, and it was decided to put the case under close observation. The diagnosis of gastroenteritis was certainly justified, as close questioning revealed the fact that the patient had eaten a supper of extremely incompatible foodstuffs, consisting of frankfurters, sauerkraut, milk, and lemonade, etc.

Four hours later his temperature had risen to 101° , his pulse was 100, and his respirations 28. Rigidity of the abdomen was more marked. He began frequent vomiting of dark, green fluid (not stercoraceous), which gradually became darker in shade, and an hour later was brown and of very strong odor. Rectal examination was negative, except for a flaccid empty rectum. Leucocyte count, 9,200; 78 per cent polymorphonuclears. In view of the rising temperature, the recurrence of vomiting, the increase in abdominal rigidity, the subsidence of acute abdominal pain, and the characteristic facies of peritonitis, it was decided to do an exploratory laparotomy.

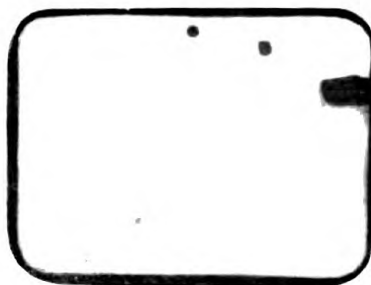
The abdomen was opened by left rectus incision and on inspection presented an inflamed, distended, small intestine, with free, foul-smelling fluid in the abdominal cavity. Before any manipulation of the intestine was done the patient died of acute cardiac and respiratory failure while under ether anesthesia. This man was an alcoholic habitué and a poor surgical risk.

At autopsy performed two hours later, the following conditions were revealed:

There was an acute, diffuse peritonitis, a moderately advanced cirrhosis of the liver, a distended, fibrosed gall-bladder, containing one large gallstone, and a marked narrowing of the lumen in the descending colon and sigmoid flexure. In the latter was discovered a large rupture, evidently the result of an ulcer which had perforated. The opening was circular with a diameter of about three centimeters. Its edges were not indurated and its general aspect gave it a punched-out appearance.

Pathological examination of the tissue cut from the edges showed a degeneration of the glandular elements, the glandular cells being entirely absent in some locations; a necrosis of the mucous membrane lying nearest to the edge of the rupture with an infiltration in this region of polymorphonuclear leucocytes; a general infiltration in other places of endothelial and lymphocytic leucocytes; a marked proliferation of the submucous fibrous tissue; a fibrous degeneration

Naval Medical Bulletin April, 1920.



Inverted supernumerary cuspid. Permanent cuspid
deep in process of inferior maxilla.

of the musculature and an engorgement of the blood vessels. In the submucosa were discovered several nonencysted amebae, probably *entamebae histolyticae*.

The conclusions in the case were that the patient had been carrying, for years perhaps, an old dysenteric ulcer of the sigmoid flexure which due to a superimposed infection, suddenly became acute, sloughed around the edges and ruptured.

I am indebted to Lieutenant H. B. LaFavre, Medical Corps, United States Navy, for the above pathological report and for his hearty cooperation in the presentation of this case.

A CASE OF MALPOSITION.

By A. C. TOLLINGER, Lieutenant, Dental Corps, United States Navy.

The patient, a private in the United States Marine Corps aged 25, presented himself complaining of thermal changes in the inferior right deciduous cuspid. Surrounding tissues were normal and healthy and the only discoverable abnormality was retention of the deciduous and absence of the permanent cuspid.

The radiographic findings showed a supernumerary bicuspid, in inverted position under the deciduous cuspid. The permanent cuspid was deeply embedded in the process of the inferior maxillary with the incisal edge directly beneath the apex of the right lateral incisor. The X-ray showed a rarefied area around the crowns of the supernumerary and permanent cuspids.

Under mandibular anesthesia, the deciduous cuspid and the supernumerary bicuspid were painlessly removed. Examination of the rarefied region did not disclose any pus. The pocket was curetted and packed with aristol. The patient was instructed to massage the parts in order to supply stimulation, in the belief that by releasing the pressure, due to the supernumerary, the cuspid would erupt sufficiently to enable an orthodontic appliance to be applied, bringing the tooth to its normal position.

Unfortunately, the patient was discharged from the Marine Corps soon afterwards, and the operator has been unable to follow the case further.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Captain J. S. TAYLOR, Medical Corps, United States Navy.
Lieutenant Commander L. W. JOHNSON, Medical Corps, United States Navy.
Lieutenant W. D. HORNER, Medical Corps, United States Navy.

GENERAL MEDICINE.

KAHN, M. H. **Position of the arm in blood-pressure measurements.** *Ann. Jour. Med. Sc.*, Vol. CLVIII, No. 6, December, 1919.

Blood-pressure readings should be obtained with the patient's arm at the side of his chest, as the normal reading varies with the arm in different positions. This holds for the seated, the standing, and the recumbent positions.

A normal individual showed the following blood pressure:

	Systolic.	Diastolic.
Arm elevated 45 degrees-----	108	68
Arm elevated 90 degrees-----	104	64
Arm elevated 135 degrees-----	92	60
Arm elevated 180 degrees-----	90	50

Patients with neurocirculatory asthenia showed a more precipitate change of pressure, the result of vasomotor instability. Patients with thyrotoxicism and exophthalmic goiter showed still more striking diminution of systolic pressure on raising the arm. Five cases of nephritic hypertension showed as a characteristic feature the high blood pressure maintained in spite of elevation of the arm, the arterial hypertonus being an important feature in the high blood pressure of nephritis. Cases of simple and paroxysmal tachycardia differed little from the normal, and the same holds true of endocarditis. But in aortic regurgitation the diastolic pressure falls more rapidly than the systolic. (L. W. J.)

WILTSHIRE, H. W. **Intramuscular injection of quinine in malaria.** *Jour. Roy. Army Med. Corps*, London, Vol. XXXIII, No. 3, September, 1919.

The three main methods of giving quinine in malaria are by intravenous injection, by intramuscular injection, and by the mouth. Of these the intravenous injection produces the most powerful action against the parasites; but in practice it is limited by a technic which

is difficult to carry out except in a hospital, and by the occurrence of serious symptoms or even death in certain cases.

These limitations do not apply in the case of intramuscular injections or oral administration, both of which are suitable for wide routine use. In consequence the present dispute concerning the relative value of these two methods is of great importance to those who have to treat a large number of cases of malaria.

Patients treated by intramuscular injection usually receive doses of 20 grains twice daily for 4 days. On the fifth day treatment is continued by mouth, 30 grains a day for at least 3 weeks. A 50 per cent solution of quinine bihydrochlorid is used for the injection. This is sterilized in an autoclave 3 days in succession before issue, and again every morning when in use. Repeated heating does not lessen the therapeutic value of the solution. The pain at the moment of administration is slight and sepsis is avoided by proper technic.

Intramuscular injection gives greater security against the sudden catastrophies which may occur in patients supposed to be well under the influence of oral quinine, and the safety point is reached after the second dose of intramuscular quinine has been given.

In addition to safeguarding life, intramuscular quinine reduces fever and alleviates symptoms far more surely and quickly than the same dose given by mouth.

Failure to stop fever by intramuscular quinine has proved a sure sign of the presence of some secondary disease, such as paratyphoid fever.

Blood examination shows that the parasites are exterminated from the blood more quickly by intramuscular injection than by oral administration.

Of cases treated by oral administration of quinine 43.7 per cent relapsed. Of those treated by intramuscular injections 5.5 per cent relapsed.

Quinine given by intramuscular injection is a more potent remedy than quinine given by mouth because it improves the chance of life, produces a stronger and more reliable action in both acute and chronic phases of the disease, and increases the chance of a permanent cure.

(Seven pages of the article are devoted to a study of the action and the fate of quinine administered by the various methods. This part is too concentrated and too valuable to be abstracted and too long to reproduce here. It should be read in the original by those interested.) (L. W. J.)

SEMPLE, D. and PRICE-JONES, C. **Gingivitis and Vincent's disease in the Army** *Jour. Roy. Army Med. Corps*, London, Vol. XXXIII, No. 3, September, 1919.

This is the report of an inquiry into the etiology, prevalence, and prevention of gingivitis and Vincent's disease.

The evidence in this report shows:

That gingivitis exists in the Army among soldiers admitted to the hospital for other diseases to the extent of 12 per cent.

That gingivitis is less prevalent among men returning from the front than among those who have not been out of the country.

That gingivitis and decay of teeth increase as age advances.

That fusiform bacilli and spirochetes are invariably present in large numbers in gingivitis and Vincent's disease of the mouth and throat.

That fusiform bacilli are normal inhabitants of the mouth.

That fusiform bacilli and spirochetes may be present in mouths free from gingivitis and Vincent's disease.

Acute ulcerative gingivitis is rare, occurring in only about 1 per cent of patients coming for dental treatment; but subacute and chronic gingivitis are very common, occurring in 12 to 20 per cent of dental patients.

An examination of Army and Navy men in hospital showed the disease to be prevalent to the same extent in each of the two groups. (L. W. J.)

SURGERY.

TAYLOR, C. J. C. **Appendicitis amongst sailors.** Jour. Roy. Nav. Med. Service, Vol. V, No. 4, October, 1919.

While on service in a hospital ship attached to the Grand Fleet, Taylor noticed that the return of the ships to their base after an engagement or threatened engagement with the enemy coincided with a definite increase in the number of cases of appendicitis sent into the hospital. A study of the admissions with appendicitis in the United States Army, in various civil hospitals and in the hospital ship during periods of quiet and of activity, seems to support his view that the disease is more common among sailors than among landmen and that its incidence is definitely increased by the circumstances of a naval battle.

The factors which favor the increased incidence of appendicitis are, the age of the naval personnel; the frequency of constipation among sailors; their frequent exposure to cold and fatigue; and the mental factor, which Taylor regards as most potent of all. In support of this belief he refers to Henry of Navarre, who loved fighting for its own sake but never went into action without having to dismount from his horse to relieve his bowels. He also quotes Job, "My bowels boiled and rested not," and Sir William Macewen, who observes that "Concentrated brain effort or profound mental distress have the power of producing effects upon the appendix and cecum and their secretion." (L. W. J.)

GAILLIE, W. E., and ROBERTSON, D. E. **Transplantation of bone.** *British Journ. Surg.*, Vol. VIII, o. 26, October, 1919.

This is a report of conclusions based on a large number of experimental operations. Some of the conclusions are:

The periosteum is not osteogenetic and should not be depended upon to assist in the production of new bone. The presence or absence of the periosteum in autogenous bone grafts is of no practical clinical importance.

The importance of the periosteum lies in its control of the circulation in the living bone. Extensive stripping of the periosteum at operation will result in necrosis which may delay the union of aseptic fractures and result in sequestration where sepsis is present. Disturbances of the circulation should be reduced to a minimum in all operations on bone.

During the first two months after an autogenous bone graft operation, the process of absorption goes on much more rapidly than that of replacement, so that at the end of this period the dense bone of the graft has become more rarefied. If the graft is not subjected to any strain and has no definite part to play in the function of the area in which it was implanted, the absorption process continues and gradually the new bone is replaced by an ordinary scar. If it is subjected to strain and has some definite function to perform, the process of rarefaction is gradually outstripped, after the lapse of two months, by the process of bone formation, and the new bone steadily thickens and hardens until it assumes the form and density required by the work it is called upon to do.

In transplanting bone for the purpose of bridging gaps in ununited fractures, autogenous grafts only should be used.

When operations are performed for the bridging of gaps or for ordinary nonunion, two points in technique must be observed. First, complete immobilization of the parts must be secured until solid union of the graft to the fragments has taken place. Second, the transplants must be embedded in the fragments for a considerable distance in order that the bone-forming qualities of the periosteal and endosteal surfaces of both transplants and fragments may be enlisted to make certain of solid bony union.

Asepsis is essential to success in bone implantation. Cases in which there is any probability of the presence of latent infection are not suitable for this treatment. (L. W. J.)

CLAYTON, J. C. **Rectal ether anesthesia.** *Lancet*, London, Vol. CXCVI, No. 4933 May 10, 1919.

Clayton reports on 450 cases of rectal anesthesia, 100 given by him self, at the Queen's Hospital, Sidcup. The operations were on solidiers, and all were for facial work. He recommends this method for

operations on the thyroid, glands of the neck, mastoid, and breast operations, bone grafts, and nerve sutures.

A dose of castor oil is given two nights before operation and an enema the following morning. Six hours before operation the bowel is washed out with saline solution until it is clear. One and one-half hours before operation an injection is given of morphia one-fourth grain and atropin one-fiftieth (sic). This should be given on the table or bed on which the patient is to be anesthetized. He should remain lying quietly in a dark room for the next half hour, and then receive the rectal injection.

The patient lies on his left side with the knees drawn up and through a catheter, introduced not more than 5 inches, the following mixture is slowly given: Olive oil 2 ounces, ether 5 to 6 ounces, paraldehyde 2 drams, or chloretone 30 grains. Then clamp the catheter and leave it in the rectum. In one-half to one hour anesthesia is complete.

After operation the residual oil and ether are allowed to run out through the catheter and the bowel is washed out with soap or saline solution until there is no smell of ether and no oil bubbles in the return.

(The reviewer has seen this method used by Capt. Clayton many times. The patient goes quietly to sleep and sleeps naturally through the operation. There is no vomiting after consciousness returns. (L. W. J.)

HYGIENE AND SANITATION.

HUTCHINSON, R. H. *Destruction of lice in clothing by steam disinfectors.* Jour. Parasitology. December, 1919.

As a result of numerous experiments which are given in detail the author comes to the following conclusions:

"If the penetration of steam is sufficient to produce a temperature of 75 C. (167 F.) in the center of a barracks bag (or other load of infected goods) all eggs and active stages of body lice will be destroyed. This conclusion, based on the above practical tests, agrees very well with laboratory experiments on fatal temperatures. Nuttall (1918) has shown that nits are killed in one minute at 70 C. in dry heat, and in 10 seconds at 70 C. moist heat.

"If the disinfectors are operated efficiently on the time schedule now employed (viz, a 10-inch preliminary vacuum, 15 pounds steam pressure for 15 minutes, reckoned from the time the steam is turned on, followed by a 10-inch drying vacuum) the requisite temperature (75 C.) is attained in every case. By efficient operation is meant (1) the maintenance of a full head of steam so that the 15 pounds pressure in the disinfecter is produced within 5 minutes, thus allowing at least 10 minutes for exposure; (2) overloading must be guarded against; (3) the individual bundles must not be rolled too tightly.

"Little if any shrinkage of woollen goods is caused by this treatment. There is, of course, some wrinkling, but these wrinkles are not permanent, but may be remedied by pressing." (J. S. T.)

EYE, EAR, NOSE, AND THROAT.

DE SCHWEINITZ, G. E. *Ocular phenomena in the psychoneuroses of warfare.* Arch. Ophth., September, 1919.

The author's paper is based on observations made in France and England during the winter of 1917-18 and at the U. S. Army General Hospital No. 30, December, 1918. Introductory remarks on the nature of war neuroses include Pearce Bailey's classification into:

1. Concussions (minute disseminated actual lesions of the central nervous system.)

2. Neuroses practically identical with those of civil life and often developing as the result of intense physical exhaustion.

3. Hysterias or conditions produced by suggestion.

De Schweinitz disregards the comparatively small group of cases with organic lesions and discusses only the phenomena occurring in the functional group. The ocular phenomena associated with war neuroses are—

1. Amblyopia and amaurosis, including disturbance of color vision

2. Asthenopia and anomalies of accommodation.

3. Pupil phenomena.

4. Anomalies of the eyelid and exterior eye-muscle movements.

5. Phenomena not included in the preceding groups.

Reduced visual power in hysterical patients is a familiar phenomenon, but the author cites striking examples of such impairment due to definite suggestion, cure being effected by the same instrumentality. An unsophisticated recruit from the country has been told by a traveling "eye doctor" that his eyes were weak and needed glasses. Not long afterwards began the trying experience of training-camp life where he was slow to learn his duties, was the victim of many a jest, and heard terrible stories about the horrors of foreign warfare. A typical neurosis developed, the prominent symptoms being tremor, whispering voice, and a reduction of visual acuteness to less than one-tenth of normal. Though his eyes were perfectly healthy all attempts to improve vision failed. Finally, a gentle but insistent suggestion that the use of spectacles would put him on an equality with his comrades with whom he would surely have to go abroad, stimulated the instinct of self-preservation and vision became normal through the use of glasses which had no refractive power whatever.

In some cases reduction of vision leads to the statement by the patient that what he sees is "smoky" or "foggy." Of course, it

possible that a retinal commotion—hyperemia of retina and papilla—may account for the cloudy vision. The blindness of neurotics may last only a few moments, from a few hours to two weeks, or months and years. Following the so-called “shell-shock” experience the soldier becomes partly or entirely blind. As he issues from the semiconscious state he may recover his vision entirely or in part or blindness may persist, especially if there is anything to direct his attention to his eyes. This psychic blindness may be accompanied by tonic or clonic spasm of the lids. Definite resistance is noted when an attempt is made to raise the lid, and if the patient tries to obey the order to open his eye the result is a trembling movement with little or no separation of the lid margins.

The neurotic symptoms referable to the eye are very closely related to some situation which causes the emotional shock to localize itself in the visual function. For example, a soldier bayonets an enemy in the face, witnesses some peculiarly horrible sight, or undergoes a trying experience at the same time that some incident suggests reduced vision.

In hysterical amblyopia or amaurosis one or both eyes may be affected. The author found that both eyes were usually affected but not to the same degree. It has been a matter of general comment that the soldier affected by hysterical blindness usually has perfect orientation, and the explanations of this phenomenon are numerous, one authority claiming that the retinal insufficiency is not so great when the patient is moving about as during steady fixation. Another considers that while the field of vision is greatly contracted in hysterical patients the periphery of the retina retains its power of perceiving large and bright objects. It has even been suggested that peripheral visual impressions may be unperceived and yet bring about the instinctive muscular movements by which people find their way about.

The author calls attention to the importance of always bearing in mind the possibility of a real organic lesion. A minute lesion may escape detection by the ophthalmoscope and of course it is perfectly possible for a real organic ocular lesion to coexist with symptoms of neurosis.

The author believes that too much stress has been laid in the past on concentric contraction of the visual field with inversion of the color lines as a stigma of hysteria and quotes various authors to the effect that in hysteria the visual field phenomena are largely the result of suggestion. Concentric contraction of the visual field with or without inversion of the color lines, tubular fields and spiral fields are commonly observed. The tubular field is the form most easily suggested. A much contracted tubular field may characterize the beginning of return of vision after hysterical blindness.

Not only may there be chromatic aberrations in the visual field as described under the general term of inversion of the color lines, but there occurs occasionally a complete temporary loss of the color-sense, an achromatopsia without material loss of form-sense and associated with practically normal visual acuteness. It is interesting to note that the victim of this hysteric color blindness recognizes perfectly the outlines and shapes of objects and matches each color with an equivalent gray tone, recognizing differences more quickly than a normal individual.

In connection with preexisting asthenopia the victim of war neurosis may develop marked spasm of the ciliary muscle or this spasm may represent the stage of recovery from blindness and be amenable to treatment by a concave lens or a mydriatic.

Usually the pupil reactions are normal, but they may be sluggish both to light and to accommodation. A true Argyll-Robertson pupil has been reported.

The author did not see any cases of so-called hysterical palsies of the ocular muscles. Other writers mention convergence of the visual axes. True nystagmus is very rare. Exophthalmos has been noted among war neurotics.

In the concluding paragraph are these words: "It is evident that these war neuroses do not differ from the peace neuroses in their symptoms and evolution except in the association of the war coloring." (J. S. T.)

CALHOUN, F. P. Ocular complications due to typhoid inoculations. Arch. Ophth., Vol. XLVIII, No. 6, November, 1919.

The author reports five cases of uveal infection which directly followed typhoid inoculation. Four cases showed iritis and two of these also showed vitreous opacities, while the fifth presented signs of punctate keratitis and choroiditis. Blood serum tests showed the Wassermann negative in three cases, positive in one, and a positive fixation for Neisser in the remaining case.

The onset of eye symptoms varied from 1 to 22 days after the first inoculation of typhoid vaccine and appeared most often after the third weekly injection.

The literature is reviewed and shows a difference of opinion regarding the number of cases directly caused by typhoid inoculation. Cases of plastic iridocyclitis, corneal ulcer, herpes of cornea and lids and retinal hemorrhage associated with nephritis have been reported as due to this agency.

Calhoun concludes that the causative factor is an endotoxin derived from antityphoid vaccine and there is an analogy between this reaction and the ocular manifestations occasionally seen after administration of tuberculin and arsenical preparations. (J. D. H.)

NOTES AND COMMENTS.

Prof. F. De Napoli in *Policlinico*, Rome (No. 45, Vol. XXVI, Nov. 9, 1919), makes an earnest appeal for definite legislation to reduce syphilis, the great menace of maternity, of racial stamina, and of the normal increase of the population.

The ravages of the war have called for remedial measures along many lines, notably in relation to tuberculosis, a matter previously rather neglected among certain of the Allies. The writer refers to the 1,500 tuberculosis sanatoria in Germany as compared with 12 analogous institutions in France before the war and notes that within a year from the commencement of hostilities a census of the tuberculous in the armies of the Republic brought to light 100,000 cases.

War, while destructive of life, brings in its wake a greater appreciation of the value of life and the need for laws to protect, improve, and prolong it. Adequate measures against syphilis are far more urgently needed than those undertaken against tuberculosis. The attitude of society has always been one of comparative indifference to the subject of syphilis, too little practical use being made of the curative and preventive agencies furnished by medical science. Treatment has been invariably not collective but for the individual as such, the attending physician becoming a confidant and in a measure a conniver at evil, owing to the combined indifference and prudery of the public. There has been a lack of systematic education in this matter. Ignorance has been favored by the inherent peculiarities of the disease itself which is often acquired without realization on the part of the victim; which is often compatible with long periods of comparative health; which in its too often fatal end-results is so masked and disguised as to teach no lesson to the victim's survivors. The pathology of syphilis underlies a vast domain in medicine coming under the cognizance of the general practitioner and clinician as well as of the specialist.

One of the grave mistakes of the general public consists in accepting with complacency the marvelous curative power of modern therapy and being oblivious to the damage to the race, a damage all the more extensive and terrible since the war. The loss of life due to the war must be made up and syphilis not only threatens the permanence and integrity of the race directly, but individually by contributing, along with malaria and industrial diseases to the invasions of tuberculosis itself.

The war has greatly augmented the social evil which was fostered before by a neo-malthusianism, by the deliberate avoidance of paternity, by induced miscarriages, by gynecological operations, all contributing their share toward reducing the birth rate. An alarming increase of syphilis has been noticed following this war, as has been the case after other wars, and the future of the civilian population is further menaced by the abstraction from civil communities of large numbers of young and healthy men and by the abnormal physical and moral state of parents.

Now is the time to attack the great enemy of the human race, syphilis, which invalidates maternity and not only stamps its impress on the unborn child but pursues its insidious course through generation after generation fastening its stigmata of degeneration upon the body and vitiating intellectual and moral faculties.

However debatable some of the tenets included in the term eugenics still something of the kind must be considered. The author quotes from Campanella¹ to prove that this great and original thinker anticipated by centuries the doctrines of Galton and shows that this sixteenth century celibate thinker fully appreciated the obligations of the State in matters relating to marriage and procreation.

The author quotes Fournier's significant estimate based on his city practice, that 20 per cent of syphilitic women are married and of them 70 per cent are infected by a husband who was syphilitic before marriage and 30 per cent by a husband who acquired syphilis after marriage.

Love of country should show itself not in a fervid effort to benefit the heroes of the war and their dependents only, but by a campaign for improved living conditions for the family, the essential unit of society. Efforts are constantly being put forth to increase the comforts of life and to surround the young with moral and physical advantages (neglecting in all this the factor of syphilis) but there is not enough thought given to increasing the birth rate and to guaranteeing the physical and mental and moral vigor of the race by eliminating one of the chief factors operating to make it unequal to the huge struggle before it in the conquests of peace. While considering the position of woman in industrial life we must consider as germane to the subject her physical adequacy to such a life; but more important than training for the competent discharge of the functions of industrial life and the discussion of

¹ Tommaso Campanella of Calabria, Italy, born 1568, was a member of the Dominican order, who studied and wrote on a variety of philosophical subjects. Following long imprisonment for supposed disloyalty to the Spanish dominion he was liberated by Clement VIII and went to Paris, where he was received with honor by Louis XIII and Cardinal Richelieu, dying in that city in 1639. (Editor.)

the numerical balance between woman workers and opportunities for them to work is the question of woman's capacity to meet the obligations belonging to her in the great program of nature.

The government's task is to formulate systematic and technical measures for the eradication of syphilis in the body social; to free from syphilis the nation viewed collectively.

Passed Asst. Surg. W. L. Bell, United States Navy (retired), referring to the paper on "Bone grafts," by Lieut. Commander E. M. Foote, Medical Corps, United States Naval Reserve Force, which appeared in the July, 1919, issue of the U. S. Naval Medical Bulletin, writes:

"I beg to take friendly issue with Dr. Foote concerning the sterilization of the motor and the manner of holding the saws (p. 438). The author states that the motor need not be sterilized as it is readily held in a towel when used and that the stem on which the saws are fastened is slipped into the end of the motor and fixed by a screw. I believe that infection is liable to creep through the towel by osmosis if the least moisture is present. The towel may slip, the motor nose may leak, and the rotary parts on the saw shaft are dangerous to hands, gloves, and the patient's soft tissues.

"Again most of us feel that all periosteum should be incised with a sharp instrument rather than a saw. Saws leave ragged, lacerated wounds in soft tissues of any sort, unfavorable to the reestablishment of proper vascular supply.

"We now have a chuck without rotating parts exposed, which permits of almost immediate change of instruments, and a mechanical shaft which permits any angle of approach and into small spaces with the motor suspended near the floor, entirely away from the field of operation. Our saws are all adjusted before operation so no measuring or calculating on that score is required.

"A preliminary article of mine, pertinent to the subject, appeared in the *Annals of Surgery*, July, 1919. Another on bolts was published in the issue of December, 1919. A more finished and complete article on power transmission, saws, exclusion of the motor from the surgical field and a few special operations and applications of self-locking bone grafts and fixtures is nearing completion.

"In the issue for October, 1919, A. L. Clifton, reporting certain operations in bone surgery, describes (case 2) cutting the spiraled ends squarely, and plating. The result was considerable shortening. Naturally I am not familiar with the difficulties encountered in this particular case, but I treat cases that I believe to be similar to the one cited by a through and through fixture (quick-locking bone bolt), utilizing the oblique fragments for self-splinting. The only

advantage is 'no shortening,' a feature which is perhaps less important in the Navy than in industrial accident work.

"I was glad to note Dr. Foote's observations about foreign bodies. I have maintained for more than 15 years that metal, *per se*, within reason, was negligible. Only as it causes undue pressure from violence of its own placing or proximity to moving tissues will it cause suppuration or extensive irritation, asepsis, of course, being observed.

"What a strange world! After the work of Ollier and Axhausen and Barth's admission of his complete failures and the fine work of Barney Brooks, Mayer, Wehner, Phemister, Clarence McWilliams, and Leonard W. Ely, suddenly appears Dr. Leriche with the statement that all our reasons for autoplasmic periostealized bone growth are fallacious and that prepared heteroplasmic grafts are the proper ones, and that all our efforts in the future should be along that line.

"Prof. Tower of the Carnegie Institute said to me that one morning, when as a child he had ridden for a half day on a merry-go-round, his old colored mammy remarked, 'Child, you done ride for hours and now you steps off right where you got on.' But I am optimistic and do not believe that our work in bone surgery is altogether a merry-go-round. There is distinct progress and definite facts are being collected. To-day, practically all of our accredited observers show most convincing parallelism, so that the statements of Leriche, after the impressive and sportsmanlike confessions of Barth, who has probably had more experience in heteroplasmic dead bone than any other man, are to put it mildly, 'quite flattening' but absolutely unconvincing."

In October, 1919, there appeared the first number of the Bulletin of the National Research Council of the National Academy of Sciences. The first article is by George Ellery Hale and sets forth the purposes of the National Research Council. The need for organization in scientific research is discussed by Elihu Root. Then follow numerous short papers by men of prominence in the industrial world. The concluding paper deals at some length and in considerable detail with the organization of scientific and industrial research at home and abroad. It is written by H. E. Howe, vice chairman Division of Industrial Research, National Research Council.

The American Red Cross announces that it has recently installed and presented to the University of Warsaw a complete up-to-date laboratory. This is the eighth laboratory opened by the American Red Cross in Poland. In all of them American-made peptone and chemical stains from American laboratories are used. Two American physicians (women) are carrying on the work of the Warsaw laboratory.

We have been asked to inform the readers of the *BULLETIN* of a new organization to be known as the National Anaesthesia Research Society, with head office at Columbus, Ohio.

The general education board has assigned the sum of \$4,000,000 to the School of Medicine of the Vanderbilt University. A great medical school will be established in Nashville, Tenn., affiliated with Vanderbilt University, as a result of this magnificent donation.

A very interesting development in medical education is represented by the plan now in operation in Detroit, Mich., under the direction of the city board of education.

The city of Detroit, which originally boasted three medical schools, now has but a single one, and that is operated under the board of education with examination and graduation requirements and a course of teaching which conforms to the standards of the board of registration and includes a year's hospital service. Instruction is free to bona fide residents of Detroit, others paying a nominal fee of \$25 annually. The Detroit Medical College, the oldest of the three original schools, turned over to the city board of education funds and property aggregating close upon half a million dollars when that board assumed the obligation of providing medical education for the sons of taxpayers in the same way that it provides primary and high-school training.

The first element in the progressive facilities offered by the city is the public school. From this pupils pass to the high school. After the high school comes the junior college, where the student may elect to take a course preparatory to the study of law, engineering, medicine, or other professional subjects. It is while students are at work in the junior college that some weeding out will be attempted by advising those who have not shown aptitude for medicine to select some other career.

The plan has been under operation for about three years and is no longer in the experimental stage. It will perhaps be necessary to place some limit on the number of students admitted to the junior college and to the medical school, not only in the interests of the taxpayers but in the interests of the school, the hospital, and the medical profession at large. This and other details are still *sub judice*.

The assumption of medical instruction by a city board of education, thus permitting continuous education (from public school to professional school), at home, for the children of the residents of the city, is a novel expansion of the idea of municipal duty and does credit to the liberality and progressiveness of Detroit. The scheme was not

put into effect without long and deep thought and considerable effort on the part of its promoters, as there were numerous legal phases to be considered and, of course, there was opposition on the part of some conservative citizens. Two medical men on the board of education contributed not a little to the success of the undertaking and have been the means of securing conformity in the scope of the instruction, both medical and premedical, to the requirements of the board of registration.

“For the first time in its history the New York University Medical College has enrolled 20 women on its roster of students.”

On October 15, 1919, Surgeon General William C. Braisted, United States Navy, was elected an honorary fellow of the Royal College of Surgeons of Edinburgh. At the same time the directors general of the British medical service, and of the Belgian, French, Italian, and Japanese medical services were honored with membership.

The Board of Education of New York City maintains six free clinics for the correction of speech defects.

Typhoid fever, which has for several years ceased to occupy the attention of medical officers of the Navy, except in so far as the carrying out of preventive measures is concerned, caused 39 deaths in 391 cases for the single quarter ending September 30, 1919, in New York

An analysis of the venereal diseases reported in California for the year ending June 30, 1919, shows the following:

Gonorrhea cases, 2,144; male, 1,480; female, 664.

Syphilis cases, 2,018; male, 1,191; female, 827.

Of the total, 4,162 venereal cases, 1,464 were in married, 2,140 in unmarried persons; 209 in the widowed; 140 in the divorced; in 200 cases no statement.

Regarding source: Commercial prostitutes, 860; clandestine prostitutes, 1,178; husband or wife, 343; congenital, 150; unknown, 1,172; not stated, 459.

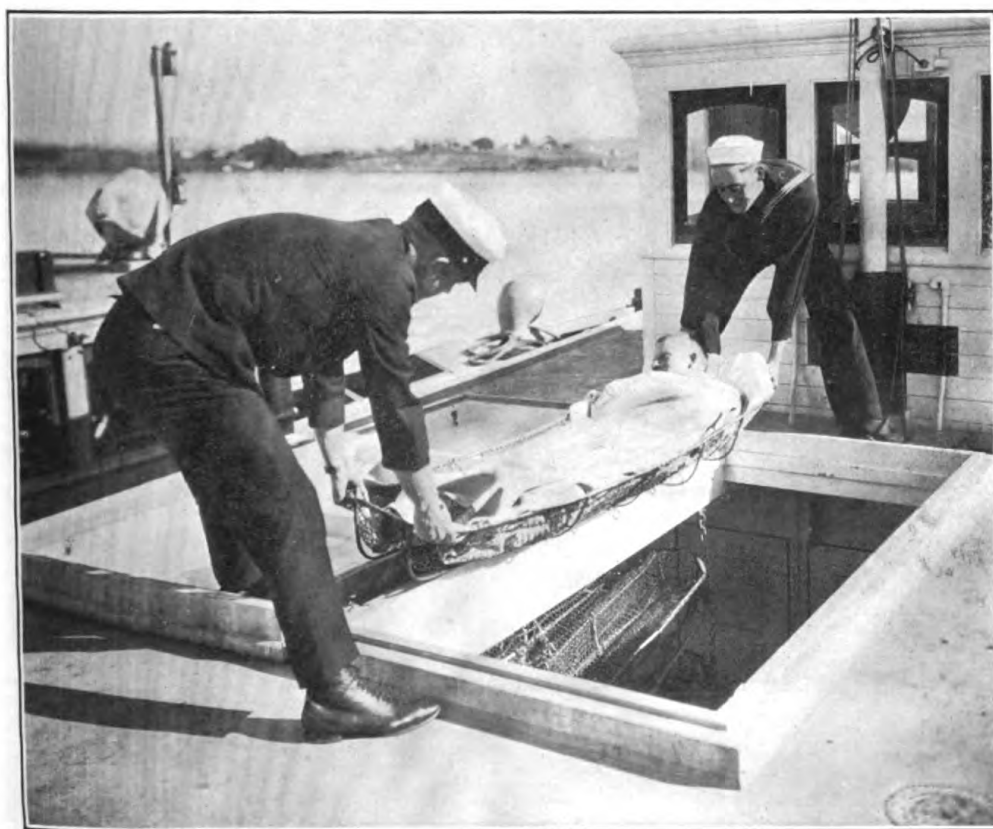
The Division of Publications, Bureau of Medicine and Surgery, regrets the omission from the Annual Report of the Surgeon General,

1919, of the name of Commander E. Crispin, Medical Corps, U. S. N. R. F. Dr. Crispin was the internist of United States Navy Base Hospital No. 3, and his name should have appeared on page 114 in a list there given of the personnel of that unit.

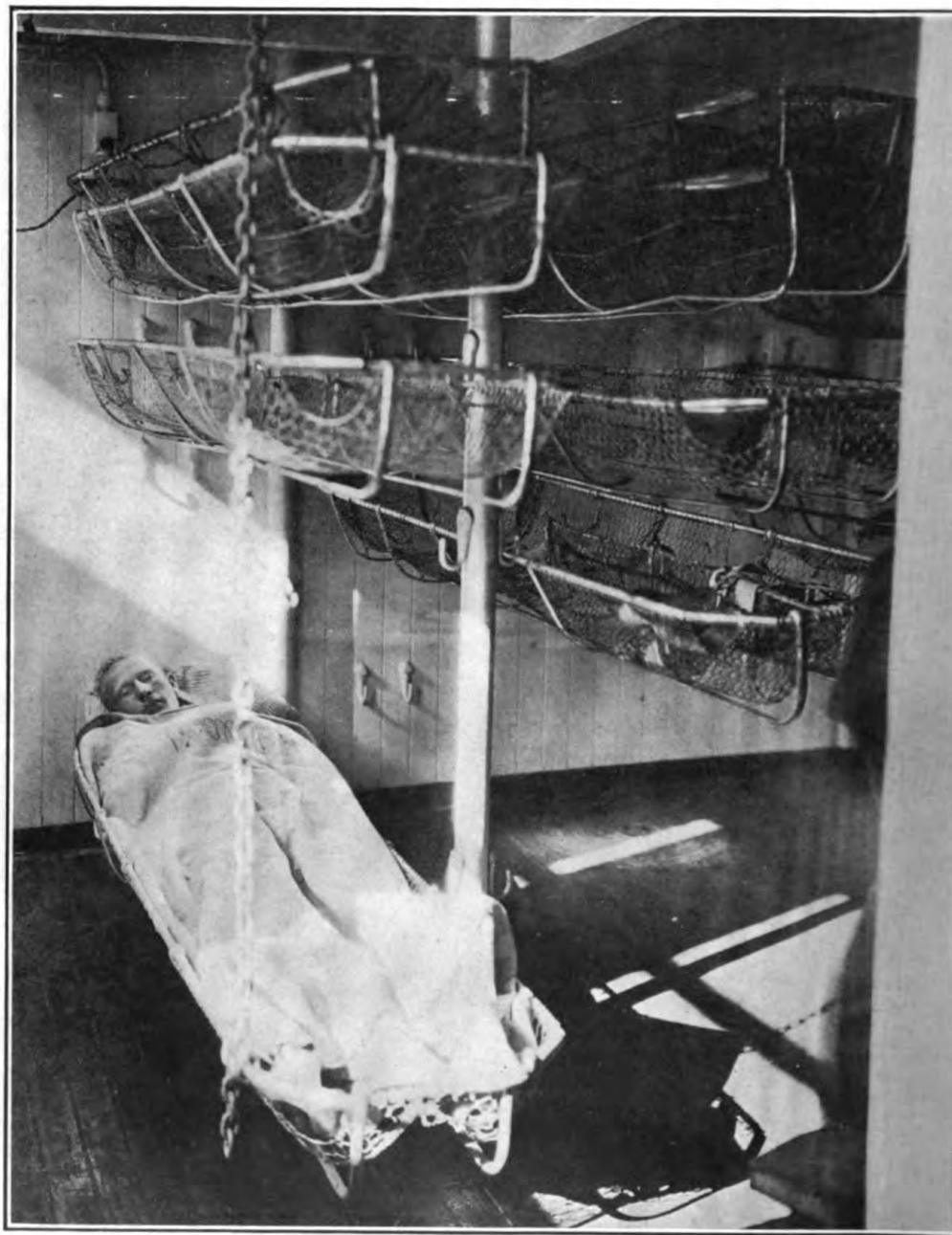
Occasion is taken at this time to crave indulgence from other members of the service whose names, deeds, reports, etc., were inadvertently, or from limitation of space, time, and the physical capacity of the compiler of the report, omitted from that volume.



U. S. Navy Ambulance Boat, No. 1.



Lowering a patient through deckhouse hatch when boat is alongside a wharf and doors at the side can not be opened.



U. S. Navy Ambulance Boat, No. 1. Main forward compartment with stretchers suspended

REPORTS.

U. S. NAVY AMBULANCE BOAT NO. 1.

By D. V. DEWITT, Chief Pharmacist's Mate, United States Navy.

Being a pioneer, "U. S. Navy Ambulance Boat No. 1" merits a brief exposition of its accommodations, plans, advantages, and possible disadvantages as a basis for providing other craft for similar purposes. Moreover, following the evident success of the first U. S. Navy ambulance boat designated as such by the Secretary of the Navy it is understood that the department has directed the construction of two additional boats on the same plans for service on the Atlantic coast.

The need for a vessel to convey patients a distance of over 30 miles from ships and stations about San Francisco to the United States Naval Hospital, Mare Island, Calif., has been rather keenly felt for some 20 years, but heretofore suitable boats or funds for conversion have not been available, and recourse has been had to station tugs, periodical navy yard tug trips and public steamships on which there were practically no accommodations for bed patients. Considerable expense was incurred for medical attendants accompanying patients. Obviously contagious cases could not be transported by public carriers and in each instance where other passengers were present, they, or patients, were subject to embarrassment or inconvenience, and the latter were usually looked upon as intruders. Those suffering acutely, seriously injured, and insane patients constituted a nuisance on public or naval vessels which had other and more important service. There has usually been an undue amount of rehandling of patients from ships or stations to small boats, thence to landings and piers, which involved decided discomfort and sometimes unavoidable exposure to patients.

All these disadvantages were most acutely felt throughout extensive mobilization and training and when ships were manned during the war, and especially in the presence of such epidemics as influenza, so that, when the present medical aide to the commandant of the twelfth naval district reported for duty at the beginning of the second influenza epidemic, and with the sending of a real fleet to the Pacific coast in prospect, it became apparent that such an urgent need could not longer be neglected.

No attempt will be made to mention the many previous endeavors which zealous officers have made to obtain an ambulance boat for naval patients in San Francisco Bay as the correspondence is not available, but the commanding officer of the United States Naval Hospital, Mare Island, Calif., had very recently renewed such effort.

While the medical aide to the commandant was formulating recommendations it was suggested by Captain H. M. Gleason, United States Navy, the construction officer at Mare Island, that there were fortunately under construction several 65-foot motor tugs destined for service on the Atlantic coast and overseas, for which, following the armistice, there would be no known need, and that while some were obligated for the Army, at least one might be converted to an ambulance boat and this was authorized by the Navy Department following personal representations.

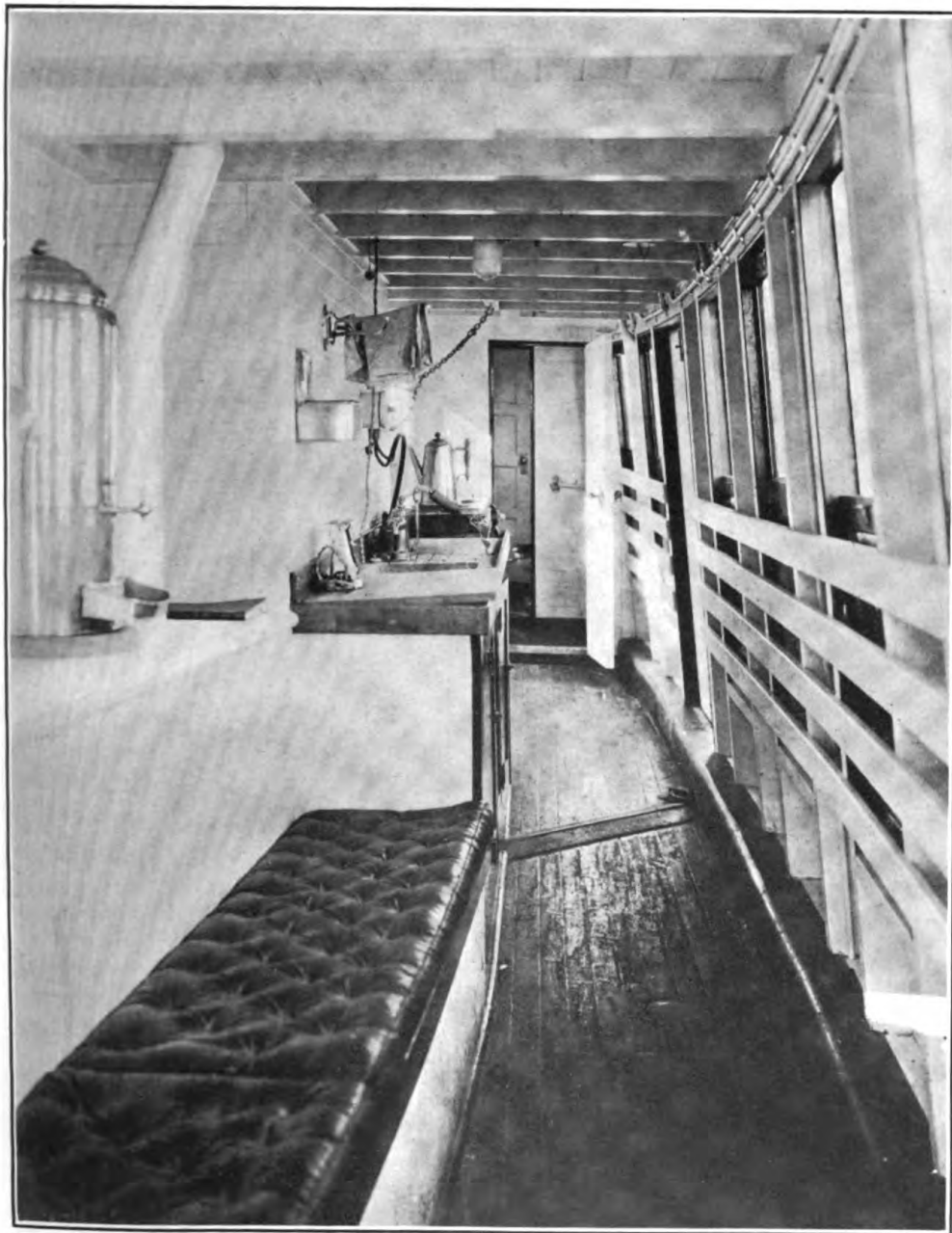
The hull division, Mare Island, deserves credit for the design following a few suggestions made by the medical aide who conceived the idea of using the standard Stokes splint stretchers as berths to save space, confusion, and unnecessary rehandling of the sick, the patients to remain in them from station or ship until put to bed in the hospital.

The boat was placed in service and delivered to twelfth naval district headquarters on August 20, 1919, and assigned a berth at the receiving ship dock, Yerba Buena Island.

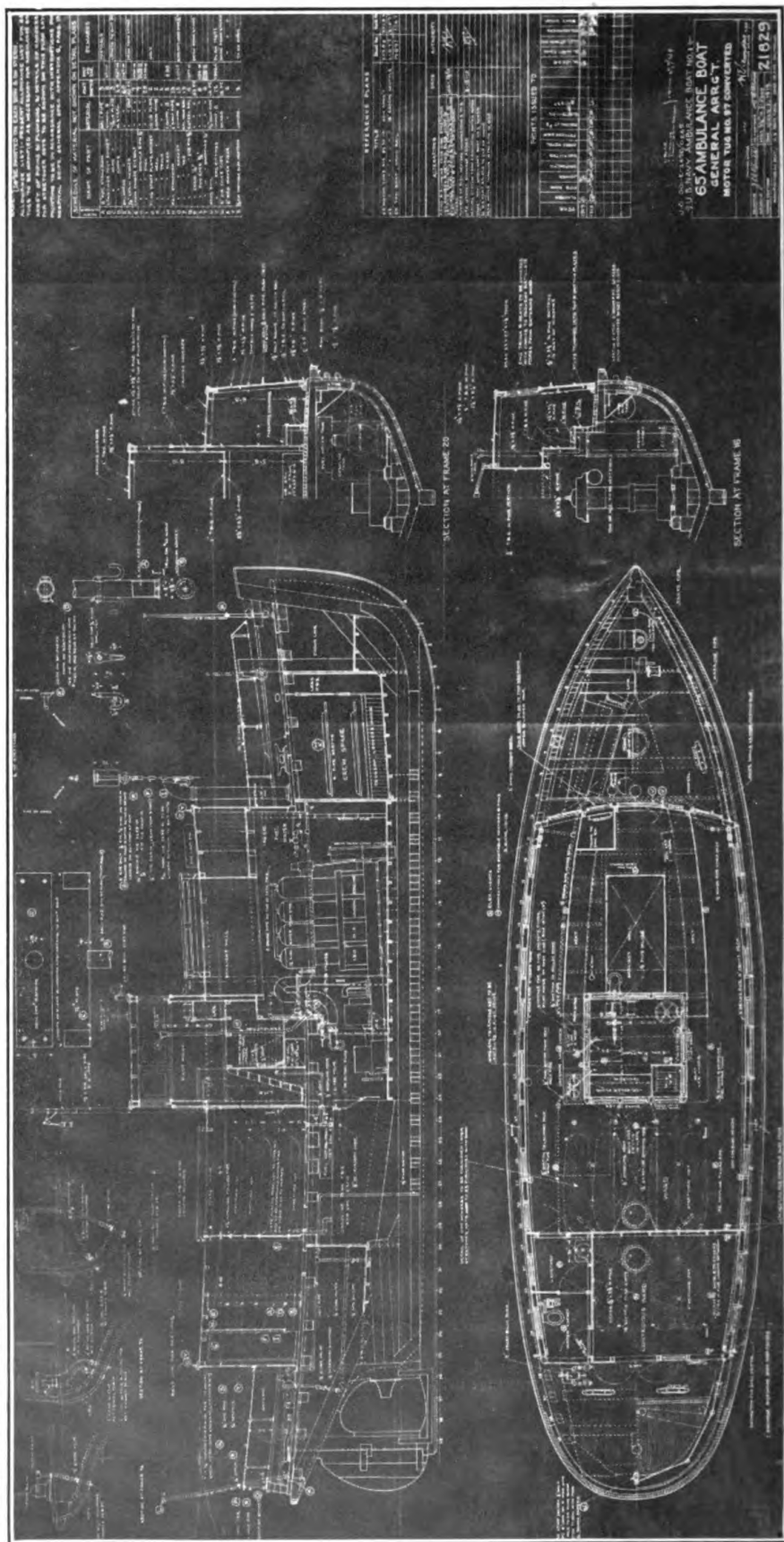
Fortunately the boat had developed much better speed than the predicted 9 knots, so that 13 knots have been attained, and 11½ knots may usually be depended upon. The time taken in making the round trip from the naval training station to Mare Island, a distance of 64 miles, including transfer of patients to hospital, is about six hours when ships of the fleet or transports do not have to be visited, so that the ambulance boat usually returns to San Francisco the same day. Radio equipment has not yet been installed.

From the date of commission, August 20, 1919, to the present writing, October 26, 1919, there have been successfully transported on the ambulance boat a total of 270 patients of all types. To obviate loss of time and undue handling of stretcher cases, a system of exchange of stretchers and linen was adopted. From ships and stations sending bed patients, stretchers and linen are exchanged corresponding to the number given by the ships and stations sending. Upon arrival at the hospital, stretchers and linen are again exchanged with the ambulance boat, so that patients are undisturbed until reaching final destination, when the linen is removed and sterilized ready for further exchange with the ambulance boat. The advantage of this system is obvious.

The ambulance boat is a 65-foot motor tug propelled by a four-cylinder, four-cycle, 150-horsepower, distillate burning Union



U. S. Navy Ambulance Boat, No. 1. Main forward compartment with diet kitchen and accommodations for seating patients.



U. S. Navy Ambulance Boat, No. 1. Plans of general arrangement.

engine, with a speed of approximately 11.5 knots, and is equipped to carry 24 stretcher and 12 ambulatory cases with as great a degree of comfort and convenience as possible for patients in transit. There are four compartments—the main forward compartment carrying 12 stretcher and 12 ambulatory cases and used for isolation; a small compartment aft on the port side containing a modern sanitary head; one equipped with modern sanitary wash-room fittings just forward of the compartment containing the head.

The forward or main compartment has double doors on each side to permit the removal of stretcher patients by that means when practical, as when the boat comes alongside of a gangway. At other times, especially when making a dock to receive patients, the stretcher cases have to be lowered through a large hatch from above. In either case it does not affect the comfort of the patient. There are two upholstered and comfortable seating arrangements running fore and aft on either side of the main compartment for the ambulant patients. This compartment is also equipped with a linen and medicine locker, sink, electric stove, toaster, provision and mess-gear lockers. Diets are furnished as required while under way.

The stretchers used are the standard Stokes wire splint and are arranged in four tiers of three each, secured at the head by two iron hooks attached to the bulkhead, at the foot by another hook attached to a 2-inch iron stanchion on the inner side and on the outer side at the foot by another hook attached to a chain suspended from overhead. This arrangement is both secure and comfortable.

The entire ship is furnished with electricity for lighting, cooking, fans, and foot warmers by a direct-connection 4-horsepower auxiliary gas engine connected to a generator. The heating of the compartments is achieved by a 2-inch pipe running fore and aft on either side and the full length of the compartments, and connected with the hot-water jackets of the main engine in such manner that it allows a free circulation of hot water through the heating pipes.

The pilot house, situated over the main compartment, was accessible only through a small hatch from the inner compartment until the need of having a door opening out on the superstructure became apparent for the purpose of allowing the pilot to get in and out quickly to superintend the handling of the lines when the boat prepares to make a landing. With this exception all the minor details of construction proved satisfactory and convenient.

The cost of maintenance of such a craft is small in proportion to its utility. The entire crew consists at present of one chief boatswain's mate, one chief pharmacist's mate, one engineman, and two deck hands.

DETAILS OF OPERATION.

The following are extracts from orders issued by the commandant of the twelfth naval district.

"Navy ambulance boat *No. 1* (converted motor tug *No. 97*) will operate under orders of the commandant, twelfth naval district, and under the immediate supervision of the medical aide. The boat will berth at, and operate from, Yerba Buena Island, San Francisco, and land patients for the United States Naval Hospital, Mare Island, at Intrepid float. The crew (one coxswain, one machinist, one radio man, and one pharmacist's mate) will be attached to and rationed on receiving ship, San Francisco.

"The ambulance boat will leave Yerba Buena Island promptly at 9 a. m., with the pharmacist's mate detailed by commandant, naval training station, to assume charge of patients from ships designated by division flagships, to collect ambulatory patients from division guard ships, and thereafter embark from destroyer detail quarters, Pier 7, and from Yerba Buena Island, any patients of which previously notified and then proceed immediately to naval hospital, Mare Island. Upon approaching Mare Island, signal or radio telephone from ambulance boat must inform the station of the number and character of cases—stretcher, ambulatory, officer, contagious, etc. A duplicate list of patients, with diagnoses, will be prepared on board, and one copy is given to the naval hospital representative receiving patients.

"In addition to canned soups, milk, etc., carried as hospital stores for the nourishment of patients en route, the receiving ship, San Francisco, will issue loaves of bread (for toast) as required for each trip, crediting provisions return at the end of each quarter with number of loaves receipted for by hospital corpsmen on transfer voucher under appropriation 'Contingent M. & S.' Lunches for the crew will also be put up by receiving ship in advance of each trip.

"The Bureau of Medicine and Surgery has authorized immediate exchange of stretchers, blankets, and pajamas in numbers corresponding to those received with stretcher patients in order to obviate discomfort by removal of patient therefrom, and confusion and great loss of time attending attempts to return identical articles to the ships and stations. It is expected that stretchers will be received from ships in good order, and blankets clean. The naval hospital, Mare Island, is directed to exchange clean blankets for those received with infectious cases, and clean pajamas for all stretcher cases.

"Ships and stations should furnish the pharmacist's mate with a list of transferred patients, giving names, ranks or rates, and diag-

noses. Inasmuch as transportation to Mare Island may involve from five to six hours, medical officers are expected to satisfy themselves that patients are comfortably placed in stretchers for the trip. Whenever the safety of the patient during transfer requires the presence of a medical attendant, it is expected that the ship or station will furnish a medical officer to accompany the patient to Mare Island. It is particularly important that the ambulance boat be not kept waiting by any ship; patients, together with hospital tickets, health records, and other necessary papers should be in readiness for immediate embarkation when the boat arrives.

"The ambulance boat will not be put to any other use without previous reference to the commandant.

"The chief boatswain's mate is in charge of the boat and will be held responsible for its upkeep, orderliness, readiness for service, besides cleanliness, training, and discipline of its crew, all orders, except those on purely medical matters, will be transmitted to or through him. He is directed to prepare a watch, quarter, and station bill in sufficient detail to assure general efficiency and safety of personnel and material against navigational and other hazards. No intoxicating liquor or smoking will be permitted on board.

"The chief pharmacist's mate shall be held responsible for proper conditions in wards and appurtenances, and his primary and paramount duty will be the careful and comfortable transportation of the sick. He shall also assist the chief boatswain's mate in emergency and in any deck duties which will not conflict with his above-named chief duties.

"The radio man in addition to the special duties required of his rating, will primarily assist the chief boatswain's mate as a deck hand in deck and navigational duties generally; in addition he will assist the pharmacist's mate in transporting patients if other hospital corpsmen are not available."

PHYSICAL DEVELOPMENT OF MEN SERVING FOR THE PERIOD OF THE WAR.

By B. G. BAKER, Lieutenant, Medical Corps, United States Navy.

It is noted in the Annual Report of the Surgeon General that reference is made to data compiled at the naval training station, Great Lakes, Ill., and Pelham Bay Park, N. Y., relative to the physical development of men undergoing training at those stations during the period of the war.

It is a peculiar coincidence that practically the same procedure was carried out at the demobilization station, St. Louis, Mo., with

the first 1,000 men discharged in May and June, 1919, with very nearly the same results. There is a larger percentage of average gain shown here, however, owing, it is believed to the fact that nearly all of these men had served considerable time at sea.

Each man was weighed and his chest measurement taken at the time of discharge. The corresponding data, taken at time of enlistment, was copied from his health record. From this the following results are shown :

Percentage gaining weight-----	83.5
Percentage losing weight-----	13.5
Percentage remaining stationary-----	3.0
	<hr/>
	100.0
	<hr/>
Total gain in weight of 835 men regardless of age-----pounds—	8,263
Average gain in weight of all men who gained-----do-----	9.897
Total loss in weight of 135 men regardless of age-----do-----	796
Average loss in weight of all men who lost-----do-----	5.896
Number remaining stationary-----	30

It was found, in a large majority of cases, that the chest measurements taken at time of enlistment were out of all reasonable proportion to those taken at time of discharge. In a great many cases men who showed a marked gain in weight, according to enlistment measurements showed a loss in mean-chest circumference. Consequently, a proper estimate of gain or loss in expansion is unobtainable. However, taking these figures as they stand, there is a gain of three-fourths inches per man for those who gained and one-fourth inch loss for those who lost in weight.

As stated above this is a record of the first 1,000 men demobilized at the St. Louis station in May and June, 1919, regardless of age, no comparison being made between adults and minors. It will be noted that the gains in weight run up as high as 36 pounds per individual.

It has been observed from experience in recruiting that a normally healthy man will vary up to 5 pounds in the course of a few days to a month, depending upon environment and his ability to eat regularly.

Taking this variation into consideration and assuming that all gains and losses in weight up to 5 pounds remained stationary, the following results are obtained :

Percentage gaining weight-----	73.7
Percentage remaining stationary-----	20.0
Percentage losing weight-----	6.3
	<hr/>
	100.0

It is believed that these percentages come more nearly representing the true facts for the reason stated above.

**VENEREAL PROPHYLAXIS AT THE UNITED STATES TRAINING STATION,
GREAT LAKES, ILL.**

By D. E. BLENDER and L. A. BURROWS, Lieutenants, Medical Corps, United States Naval Reserve Force.

It is not the intention to endeavor to show that venereal prophylaxis as carried out at this station is of no value, for its value has been clearly shown. There is no desire to make destructive criticism, but rather constructive, and if possible suggest a means of increasing the value of prophylaxis.

From such data as have been obtained at this station it appears that too long an interval does elapse between exposure and the use of the prophylaxis. This is difficult to overcome because there are no prophylaxis stations available in this district and no prophylaxis is given the sailor to take with him. This condition could be best met by supplying the men with some means of prophylaxis when going ashore.

To supply them with the proper material is important. It must be easily carried and safe to use regardless of time, place, or accessories such as water, towels, etc., preferably something that will not stain the clothing.

The fact that men will expose themselves to infection still remains and can not be overlooked.

The following statistics taken as they come from the sick bay speak for themselves as to the time elapsing and the use of the prophylaxis:

	Per cent.
After a lapse of 1 hour.....	1.7
After a lapse of 2 hours.....	3.2
After a lapse of 3 hours.....	6.4
After a lapse of 4 hours.....	7.7
After a lapse of 5 hours.....	7.0
After a lapse of from 6 to 10 hours.....	48.4
After a lapse of 10 hours (or more).....	25.6

No endeavor has been made to show the value of prophylaxis, as there is sufficient data on that point, but it is agreed by the majority of observers that prophylaxis taken after a lapse of six hours is of comparatively little value. The figures show that the great majority of the cases have taken their prophylaxis after a lapse of six hours or more. In fact, only 26 per cent take it in less than six hours. If only 26 per cent avail themselves of prophylaxis in less than six hours and prophylaxis is of no value after that length of time, the present methods can not be efficient. The efficiency would be raised if some other means of prophylaxis were used immediately after exposure. In ordinary commerce or industry any method giving only 26 per cent efficiency would not be used.

We wish to call attention to the use of tincture of green soap as a substitute for the present method. Tincture of green soap is an excellent bactericide, even when well diluted with water, and can be used in full strength without harm to the skin. A small quantity is necessary to cover the parts thoroughly. It is a liquid, is easily applied and does not stain or injure the clothing. It can be used at any time or place, since water is not needed to get the best results. The men should be instructed to cover the parts well with the soap, leaving it on for an hour or more, depending on the availability of water. An exposure of one hour to the tincture of green soap is sufficient to destroy all ordinary organisms. One-half ounce is sufficient for two applications, and a bottle of that size is easily carried even in the limited pocket space which the sailor has available.

This method of prophylaxis would reduce the number of cases of venereal disease, consequently becoming of economic value to the service.

REPORT OF 506 TONSILLECTOMIES UNDER LOCAL ANALGESIA.

By W. P. VAIL, Lieutenant, Medical Corps, United States Naval Reserve Force.

Of the total number of cases treated in the sick bays of the various naval establishments, a high percentage are throat, nose, and ear troubles of an acute type. This is particularly true along the northern Atlantic seaboard, where there have been a large number of cases of tonsillitis, rhinitis, and otitis media. If an average be made of the number of sick days from these cases, it will be found that the patients lost from 5 to 15 days, according to the disease and the intensity of the attack. If the mean be placed at seven days for each of the cases under consideration, and to this be added one or two days on one or the other end of the trouble, a surprisingly large number of sick days will be given when the men of the entire naval force are considered, i. e., a very large number of days lost to the service. These men, not able to perform their usual duties, become a care to their fellows instead of a help, and they occupy beds in hospitals and sick bays that need not be occupied by them, for the reason that in a large measure these diseases may be prevented.

The whole trend of the practice of medicine being along the lines of prevention of disease, the opportunity of the medical corps becomes patent at once. By preventing, so far as may be, this large class of diseases, the efficiency of the service is much increased, much suffering is obviated for the individuals concerned, and their future health is safeguarded.

In the training camp of the receiving ship at Philadelphia there was the usual high percentage of these diseases. The writer's views

in the premises received the hearty support of Lieutenant Commander C. W. Smith, Medical Corps, U. S. Navy, the senior medical officer. Both felt that we should endeavor to send men overseas who were not only free from the "acute infectious diseases," but men who offered a probability of standing up under conditions of exposure, dampness, fatigue, etc., without requiring frequently to be sent to the various sick bays and to be taken off duty. In other words, it was felt that, so far as it was possible, the men sent for duty overseas should be not only well at the time they were started across, but that they should offer a strong probability of keeping well while on the way and after their arrival in their new stations.

The report of 505 tonsillectomies performed by the writer covers the period from June, 1917, till June, 1919. With the exception of the first 30 cases, the operations were all performed in the sick bay of the camp. The first thirty were done in a naval hospital. All were done under local analgesia. The number of operations could have been much greater if there had been additional beds available for the care of these patients. Operations were done "when, as, and if" there were vacant beds in the sick bays to accommodate the men. None were done during the epidemic of influenza (a period of three months). And it was only when his additional duties as medical executive and sanitary officer of the camp permitted that operations were done.

Local analgesia was used as a matter of routine because of the greater facility in performing the operation, the lessened discomfort to the patient, avoidance of "ether sickness," and because of the shorter time required. Besides these reasons it was felt that a general anesthetic required transfer to a hospital with transfer of papers, etc., and in a large number of cases if the hospital had been insisted upon the operation would not have been done because the patient objected to transfer. The writer had, previous to his entry on active duty in the Medical Reserve Force, done a rather considerable number of these operations both in the clinics of Philadelphia and in his private practice. He had developed what appeared to him a safe and a satisfactory method of tonsil removal, giving little or no pain to the patient and a complete removal of the faucial tonsils.

The technique of the "snare-eversion" operation is given at some length with observations as to changes in the various steps. The patient sits upright in a chair facing the operator. The light is slightly above and to the side of the patient's eyes; the operator's head mirror is in front of his eye opposite to the position of the light; i. e., with the light at the patient's right, the mirror is in front of the operator's left eye.

SOLUTIONS USED.

The tonsils themselves, the anterior and posterior pillars, the posterior pharyngeal wall and the uvula are painted over twice or thrice at intervals of 2 or 3 minutes with a 10 per cent solution of cocaine, care being used that none of the solution runs down the throat. This is made certain by using a small cotton applicator, wound rather tightly around the stick. In the case of a few patients who were apprehensive of the operation, hyoscine hydrobromide gr. $\frac{1}{100}$ was given under the tip of the tongue 20 minutes before the operation and allowed to dissolve there.

The solution injected was, in about 400 of the cases, a solution of cocaine, in strength one-half of 1 per cent, to which was added 3 or 4 drops of adrenaline 1:1,000. This proved in all respects the most satisfactory solution. In amount a total of 3 or $3\frac{1}{2}$ drachms (15 mls) of the solution was injected. In 30 of the cases a solution of one-tenth of 1 per cent cocaine was used, following orders from the medical executive officer who was an excellent general surgeon.

It is well known that various solutions injected about the tonsils and elsewhere will produce analgesia. Normal saline solution, if in sufficient amount, will by pressure block off pain. The effect of a moderate amount of one-tenth of 1 per cent cocaine did not, in the hands of the writer, prevent pain, and with the order that this solution alone should be used a deviation from his usual technique was made; i. e., a much larger amount of solution was used (up to 6 drachms—24 mls) and the solution was more deeply injected. This gave considerable distortion of the parts, and in cases of buried tonsils made the operation more difficult. The deeper injection, probably back of the fascia underlying the tonsil fossae, produced infection in three cases (v. infra). When the writer was able again to use his own judgment he returned to $\frac{1}{2}$ per cent cocaine with gratifying results as to analgesia and absence of infection. Procaine in strengths of one-half and 1 per cent solution (with adrenaline gtt iii added) was used in a series of 65 cases. There seemed to be a less complete loss of pain even with the 1 per cent procaine than with the one-half per cent cocaine. And there was a noticeable number of patients who showed effects from the drug i. e., anxiety, increase in the pulse, and in the respiratory rate, a marked loquaciousness and inability to lie quietly after the operation.

In but two cases out of 400, with one-half per cent cocaine used, were toxic symptoms noted. These two were consecutive cases. The solution had been made up several days previously and had been corked during the interval. The first of the two patients, a hospital corpsman, showed, during the operation, a stimulation and desire to talk and restlessness. This was taken to be an idiosyncrasy to

the drug, and the second operation was started. Following the injection of the second case it was found that the first patient was markedly affected—pulse, 140; respiration, 40 to 60. He felt an air hunger with apprehension of approaching dissolution, great restlessness, and great talkativeness. The symptoms continued for 1½ hours. Strychnine sulphate gr. $\frac{3}{16}$ and atropine sulphate gr. $\frac{1}{16}$ were given by hypodermic, and the symptoms rather quickly subsided when once they started to ameliorate.

In the meanwhile the second patient's operation was proceeded with and some of the solution thus removed with the tonsils. The second patient experienced symptoms comparable in kind to those of the first, but to a much less degree. Both patients made uneventful recoveries after this period. It is believed that the solution (which had given no untoward symptoms when freshly made) had become of greater strength on standing and that the symptoms are to be explained by this fact, i. e., it was not a one-half per cent solution when used. The solution having been almost completely exhausted with the second operation, the strength could not be ascertained by analysis.

The solution of choice then, in the writer's opinion, is a solution of cocaine hydrochloride one-half of 1 per cent, with 3 or 4 drops of adrenaline added. The amount of solution used is 3 or 3½ drachms (15 mills). Some time ago it was customary to use much larger amounts of adrenaline, up to 8 or 10 drops. It is believed that this large amount of adrenaline is not necessary and that it is harmful by producing rapid pulse and respiration in the patient, and by increasing the tendency to post-operative bleeding. Adrenaline 1 drop to a drachm of solution gives good hemostasis and does not cause unpleasant symptoms.

INJECTION.

Injection of the solution is made with a long tonsil syringe, the barrel (size of a lead pencil) being largely within the patient's mouth at the injection, i. e., the needle is not of unusual length, and there is not a long, thin (and therefore flexible) tube leading from the barrel to the needle. The needle has an angular tip at about 30°.

If the operator will observe the following two points he will add much to his own comfort and to the patient's as well. First: Dispense with the tongue-depressor so far as possible. If it is used at all, press only on the anterior part of the tongue with it. If the patient will breathe rapidly and audibly through the open mouth—sounding precisely like a dog panting on a hot day—the base of the tongue will be found to be down out of the way and the throat will be much steadied. By this very simple procedure of breathing

in and out through the mouth gagging is reduced to a minimum and often obviated absolutely. Second: Work in short shifts and allow the patient to spit frequently. The writer speaks with considerable feeling on these two points, for in the removal of his own tonsils under local analgesia, while he felt not the slightest pain, he retched and gagged (due to the tongue-depressor far back on the tongue) and thought he would suffocate because of the accumulation of mucus in the throat, which he was unable to spit up because the operator did not give him frequent opportunities to do so.

With the long tonsil syringe in the left hand, the first injection is made low down toward the tongue under the mucous membrane of the anterior pillar of the left tonsil, 30 minims (2 mils) being injected here. A like amount is injected high up, back of the left tonsil, between it and the left posterior pillar. The third injection is then made below the tonsil, midway between the anterior and posterior pillar, and the left tonsil is prepared for operation.

The syringe is now taken in the right hand and the steps are repeated with the right tonsil, i. e. (1) low in anterior pillar, (2) high up between tonsil and posterior pillar, and (3) beneath the tonsil. The third injection may require the use of the tongue depressor, if the tonsil is elongated and extends far downward. If it is found that there is a low lobe of lymphoid tissue between the faucial tonsil and the base of the tongue (really part of the lingual tonsil), a few drops of the solution injected into it will allow it to be removed painlessly (v. infra.).

By the time the second tonsil is prepared the first one is insensible to pain in the vast majority of cases. Patients who have had repeated attacks of tonsillitis, especially if there has been a quinsy, or who have had a recent attack (the parts not being back in normal condition) will experience pain for the reason that the adhesions about the tonsil, the fibrous tissue present, prevent proper infiltration of the solution about the capsule of the tonsil. Except in such cases pain is either absent or extremely slight.

THE "SNARE-EYERSION" OPERATION.

The operation of choice, in the writer's opinion, is the "snare-eversion" method described by Fielding Lewis. An Allis tenaculum (designed for work about tuberculous glands) offers many advantages over all the tonsil tenacula known to the writer. The Allis tenaculum has short mouse teeth, is of sufficient length to give a resiliency when fastened, does not easily tear the tonsil, is small enough to fit into the tonsil substance deeply and give a firm hold, and can be removed instantly when desired, the teeth not catching in the tonsil.

The Allis tenaculum is grasped with the left hand and is inserted deeply into the substance of the left tonsil, practically at a right angle to the free surface. A sharp, straight, pointed knife is inserted into the tonsil substance, cutting upward from the anterior surface, the point reaching up beyond the union of the two pharyngeal pillars, is turned part way, and now cuts downward in the posterior portion of the tonsil substance. The knife is withdrawn and the tenaculum is removed. The patient spits up mucus and blood. It will be observed that the tonsil now presents an incision of the form of an inverted V or U. While the patient is clearing the throat, the snare wire is fashioned somewhat like a capital omega, Ω , i. e., bulged at the sides of the loop, and the loop is brought to about the size of the individual's tonsil. The snare used is an Eves snare with a straight pull, without ratchet. The wire is No. 8 steel wire, so cut that the reflected ends do not project out of the canula of the snare, with sufficient length to pass easily over the tonsil, but not so long as to remain outside the canula of the snare when pulled home.

With the snare wire thus adjusted, the tenaculum is passed through the loop and with the left hand inserted from up to down deeply into the tonsil substance, probably reaching in part into the cut just described in the tonsil substance. The left hand makes gentle traction on the tonsil toward the mid line; the right hand, grasping the snare, makes pressure outward with the snare wire, which now encircles the tonsil. The pressure outward of this wire with the gentle traction inward of the tenaculum causes the tonsil to evert or to "cauliflower." The tenaculum is now allowed to hang free, no further tension being made with it. The uvula is observed to make certain the wire does not include it within the loop. After making sure of this the snare is pulled home and the tonsil is completely removed.

It will be observed that the operation described is in no sense a dissection operation. Nothing outside the tonsil is touched except by the snare wire, which hugs the tonsil capsule very closely in its passage. In this series of 505 cases and in those previously done has the writer yet to find that the "breaking up" of the tonsil with the sharp knife has pierced the capsule surrounding the tonsil. The snare wire has followed the tonsillar capsule very intimately, removing the entire tonsil with its capsule, giving no injury to underlying structures or to the pillars of the fauces (v. infra.).

The right tonsil is now removed the same way as the left, but using the right hand for the tenaculum and for the knife and the left hand for the snare. Following the removal of the second tonsil the tonsil pits are examined for possible remnants of lymphoid tissue. The presence of such fragments is suggested if the capsule is found to be incomplete in a given area when the tonsil is "folded

in" to the anatomical form it had while in situ. A highly placed upper pole may be concealed by the arch over the apparently empty tonsil pit: or a part of the tonsil may remain hidden behind the anterior pillar if there have been adhesions or a recent inflammation. If present, such remnants are grasped by the tenaculum and snared as above described.

If a low lobe remains (the lingual tonsil fold already mentioned), it is grasped by the tenaculum and removed by means of the knife from without inward till close to the tongue and then from within outward. Or it may be removed by a pair of curved scissors.

The empty tonsil pits, now free of bleeding, are touched with a solution of one-half strength tincture of iodine. This lessens the amount of subsequent slough very much and patients begin sooner to eat if it is applied. The patient is given a tablet of codeine, $\frac{1}{4}$ grain under the tongue, and is put to bed. He is urged to lie quietly, not to "scrape" the throat, but is allowed to spit out mucus without hawking or "scraping." No gargle is used till the following day, say 15 to 18 hours later. The patient is allowed to drink liquids of any desired temperature the evening of the operation. By holding the scruff of the neck tightly with the hand the pain caused by swallowing is considerably lessened, and fluids can be drunk in this way without the exquisite pain otherwise felt.

AFTER TREATMENT.

The day following the operation the patient is instructed to gargle the throat hourly with a hot normal saline solution, using one-half teaspoonful of ordinary table salt to a glass full of hot water. There is a great tendency for the patient to make the solution much stronger than a normal solution. He should be told repeatedly the proper amount of salt to use in his glass of hot water. The patient's throat is dressed by the medical officer daily for four or five days, using either the one-half strength tincture of iodine or a 10 per cent silver nitrate solution, or 15-25 per cent of silvol (argyrol). The patient is urged to eat (eggs beaten up in milk, ice cream, milk toast, poached eggs, etc.), increasing the variety of food till he is able to go on regular diet again. The frequency of the saline gargle is gradually diminished, and at the end of a week the tonsil pits are usually free of slough.

COMPLICATIONS.

Infection.—This was present in three cases as already noted. Swelling of the tissues at the side of the neck, fever, pain, tenderness, etc., presented themselves. The swelling continued in two cases and external evacuation of the abscess was done. The third case subsided under hot saline dressings constantly applied, with the use later of ung. hydrarg. et ung. belladonnæ, ââ over the area.

In the series of cases here reported, eight tonsillectomies were done during an attack of acute follicular tonsillitis with fever present. All of these patients showed a drop in temperature to nearly normal within 12 hours after removal of the infected tonsils and subsequent normal temperature. In each of them the patient said he felt better the day following the operation than he had felt just previous to the tonsil removal, and he ate better than during the tonsillitis attack. There was in none of these cases any infection or any complication whatever beyond bleeding in one case, which was easily controlled by pressure and which did not recur. Two cases of Vincent's angina were operated on in the acute attack, with an absolutely uneventful subsequent course.

Hemorrhage.—In this series there were three serious and alarming cases of bleeding following the operation. The first required suture of the pillars with gauze pad in the tonsil pit; also subsequent resuture under ether; also all the usual styptics locally applied (v. infra); also horse serum hypodermically, saline solution in the bowel, calcium lactate, coagulin, thromboplastin, etc. The patient recovered, but for a time there was considerable anxiety present, as there was a complete absence of the clotting function of the blood, which welled up without let or hindrance.

The other two were cases of toxic goiter, referred for operation by a colleague. In both instances the bleeding was excessive, even alarming. Saline solution was required in one of the cases, and horse serum was given hypodermically. Both patients recovered. The blood pressure in these patients was not ascertained. There was evidence in both of them of impaired clotting of the blood, though they are probably not to be classed as true hemophiliacs.

In a moderate number of cases there was bleeding either at the time of operation or within three or four hours thereafter. Such cases were treated by pressure with a large gauze tampon firmly applied to the bleeding area. If a bleeding point or spurting vessel can be isolated it should, of course, be fastened with a hemostat and tied off. If the bleeding is a venous ooze it is usually from the lower pole of the tonsil attachment. Spurting on the other hand is more frequently observed from high up under the overhang of the arch of the pillars, and can be observed if this structure be gently lifted upward. If any tonsil tissue has been left in situ there is more likelihood that there will be bleeding than if the tonsil has been cleanly and completely removed with little injury to surrounding structures. The first thing to be done in a tonsil case that has been bleeding is to remove the clot from the tonsil pit. Pressure made over a clot is futile and worse; it is a loss of valuable time. Remove the clot and make pressure with a large, tightly rolled gauze tampon. This pressure in itself may arrest the bleeding. If it does not do

so, the writer places confidence in the following drugs, ordinarily at hand, in the order named: Hydrogen peroxide (applied freely on gauze or a large cotton tampon); alcohol (applied sparingly, i. e., do not use enough to run down the throat when pressure on the tampon is made); tannic acid; tannic and gallic acid, $\bar{a}\bar{a}$; Monsell's solution; adrenaline (last on the list of drugs to be applied). Personal experience, the testimony of one's colleagues, and the teaching of therapeutics all agree in placing adrenaline in a low position for this use, unless the user is prepared to consecrate the balance of the night to the case in hand, or to return for a subsequent hemorrhage.

In obstinate cases of bleeding, suture of the pillars with a gauze pad tied in the tonsil pit, stypticin, coagulin, calcium lactate, or chloride, gelatin by the mouth, horse serum hypodermically, and warm saline solution per rectum or intra-venously to replace lost fluid, will usually give a happy issue out of the trouble.

If suture of the pillars be done, a heavy curved (semicircular) needle is indicated, the anterior and posterior pillars being pierced far from the free edge so as to give a firm hold for tying in the gauze pad. The pad is removed with safety usually at the end of 24 hours, and a saline gargle is cautiously used. In cases of post-operative bleeding, one must act judiciously, and the first thing to be done is to remove the clot. Have a good illumination of the field and try first the simple procedure and later, if need be, the more drastic ones. If the patient is nauseated and frequently retches, it is well to produce emesis by giving a glass of warm water. Following the vomiting of the swallowed blood the patient will remain more quiet, thus obviating subsequent retching and straining.

Edema of uvula.—The uvula at times becomes very tense and swollen following tonsil removal. Especially is this so if the uvula is of a long type, suggesting amputation at the time of the tonsil operation, or if the tonsils have extended high up and close to the base of the uvula so that its lymphatic drainage is interfered with. In such cases the uvula may become as large as the distal phalanx of one's forefinger and add to the patient's pain and inability to swallow, besides causing cough and gagging. This condition can be readily overcome by grasping the tip of the uvula with a tenaculum and amputating a moderate amount of the swollen mucous membrane with a pair of scissors. Within a half hour the edema will have very largely drained out by gravity. The patient experiences little or no pain at the amputation of the tip (another example of pressure analgesia) and great relief very soon thereafter.

Pneumonia.—Two patients developed a frank pneumonia following operation. Both pneumonias developed four days following the tonsillectomy and were lobar in type. In the absence of a general anesthetic, the condition can not be attributed to aspirated material.

Both patients were in robust health at the time of operation, and there were no complications in either case other than the subsequent pulmonary condition. Both patients made complete recoveries. One of them, a hospital corpsman, some months subsequently (at the time of the influenza epidemic) did work that is beyond praise for its efficiency. He was not attacked by the epidemic.

Diphtheria.—One patient developed diphtheria a fortnight after his tonsil removal, the throat being entirely healed at the time. The exudate was on the posterior wall of the pharynx, the tonsil fossæ not being involved.

OTHER TYPES OF OPERATION.

The snare-eversion operation above described as the operation of choice for "local" tonsillectomies is not suitable for all cases. Out of the 505 cases in the present series it was not possible to enucleate the tonsils by this method in 48 cases. These cases are those which have recently or repeatedly been inflamed and are tightly bound down with fibrous tissue. And especially is the snare-eversion method not applicable in cases that have had quinsy.

In such patients an extra-capsular dissection with a sharp knife, scissors, or a "semisharp" dissection with the sharper of the two ends of a Freer submucous elevator to free the adhesions is done, using the snare to complete the removal. Or the removal may be finished with the knife or scissors without recourse to the snare.

THE ADENOID.

The pharyngeal tonsil (adenoid) was removed under local analgesia in only two instances during this series of cases, and for the following reasons: (a) The writer has not succeeded in doing this operation thoroughly except with much pain to the patient; (b) he believes that unless done thoroughly the operation is of only temporary benefit because of the tendency to recurrence of the adenoid.

From an anatomical consideration of the form of the area occupied by the adenoid and by the tubal tonsils, it seems futile to the writer to expect any rigid or boxed-in instrument alone (of which the adenoid curette and the La Force adenotome may be taken as types) to remove completely the lymphoid tissue present in the nasopharynx and about the openings of the Eustachian tubes without doing injury to these structures themselves.

The writer's procedure with the adenoid is to use first an adenoid curette of appropriate size, removing with it the bulk of the lymphoid mass. Then to use an adenoid forceps for individual masses near Rosenmüller's fossæ, and then a finger curettage about

the tubal orifices with the forefinger covered with one or two layers of sterile gauze. On this last maneuver he places the greatest confidence for removing the small lymph masses not otherwise removable and for avoiding injury to the openings of the Eustachian tubes.

The tremendous rôle of the adenoid as the cause of acquired deafness is fully appreciated by the writer. And because of this fact, patients requiring removal of the adenoid were referred to the hospital where the operation was done, presumably under ether.

SCARRING.

There is one feature of the final result of a tonsil operation that is not always pleasing to a conscientious operator, i. e., the fusing of the anterior with the posterior pillar and the obliteration of the tonsillar fossae that are observed at times when least expected. For example, a perfectly normal and uneventful tonsil operation has been done, with no muscle fibers on the removed capsule. The tonsil has been completely removed. The after treatments have been carried out carefully and the slough has disappeared entirely. In a fortnight the throat is examined and this matting together of the two pillars is found. What is the cause, and how can this be prevented? It seems to be suggestive that these cases are the ones who suffer least following the operation and who begin soonest to eat. And probably they are those who do not report back for dressings so long as do their less fortunate brothers whose throats give them trouble for a greater time. It may be that the stretching of the forming fibrous tissue mechanically by means of local applications may have some influence in keeping the tissue from closing in. This view is offered as a suggestion only, and the writer would be very glad to learn the cause and the method of preventing this fibrous obliteration of the tonsil pits, which, while it gives no symptoms to the patient, is nevertheless not the perfect result one would like to see.

The following tabulation shows for what underlying cause the operation was done, etc.:

	Cases.
Adenitis, cervical.....	2
Arthritis (various joints involved).....	10
Asthma.....	2
Diphtheria.....	6
Endocarditis.....	3
Goitre, toxic (hyperthyroidism).....	2
Laryngitis, chronic.....	8
Meningococcus carrier.....	1
Myositis.....	1
Nephritis (post-scarlatinal, etc.).....	8
Otitis media, acute catarrhal.....	8

Otitis media, acute suppurative.....	18
Otitis media, chronic catarrhal.....	35
Otitis media, chronic suppurative.....	7
Quinsy (repeated attacks).....	28
Rheumatism (repeated attacks).....	12
Tonsillitis (repeated and often recent attacks), all cases.	

Previous incomplete tonsil operation had been done in 14 cases.

	Cases.
Operation done during acute tonsillitis attack.....	8
Operation done during Vincent's angina.....	2
Abscess found at operation in one or both tonsils.....	33
Papilloma of tonsil, in these cases.....	2
Papilloma of uvula, in these cases.....	5
Uvula amputated with scissors at operation or for edema.....	30
Dissection of lateral lymphatic bands of pharynx.....	1
Removal of pharyngeal tonsil (adenoid).....	2
Infection, post-operative, with abscess formation, 2 cases; without abscess formation, 1 case.....	3
Hemorrhage, severe, post-operative.....	3
Developed diphtheria (fortnight after operation).....	1
Developed pneumonia (4 days after operation).....	2
Method of operation used:	
Snare eversion.....	457
Scissors and scissors dissection.....	17
Dissection, sharp and semisharp.....	31

BOOK NOTICES.

EVERYDAY MOUTH HYGIENE, by *Joseph Head, M. D., D. D. S., W. B. Saunders Co., Philadelphia, Pa., 1920.*

It appears that some publishers can still procure good paper to print books on and that there are some writers left who are content to deliver a message without trying to be encyclopedic.

Dr. Head's contentions are few and simple. The daily use of dental floss is essential for the proper care of the teeth, but it must be correctly manipulated as explained in the text and demonstrated by abundant illustrations. The dental floss is the most thorough mechanical detergent of teeth and gums and furthermore induces the elaboration of a protective ferment by a sort of vaccination. The toothbrush must be small and have short bristles. Mothers, nurses and school teachers will find the book useful.

DISEASES OF THE SKIN, by *Milton B. Hartzell, A. M., M. D., L. L. D., professor of dermatology, University of Pennsylvania. Second Edition. J. B. Lippincott Co., Philadelphia, Pa., 1919.*

The book is well written by one who is an acknowledged authority. It has, in common with many other books, a feature which should be omitted—the use of a single synonym for two clearly differentiated conditions. For instance: Measles, page 388, has the synonym rubeola and rubella, page 391, has the synonym rubeola. The synonym anthrax is used for carbunculus. Under etiology more consideration might have been given to the causative agents. A description of the organism concerned, its method of growth, staining, motility, etc., would often be of assistance in diagnosis and yet would not add to the size of the book to any extent.

THE NARCOTIC DRUG PROBLEM, by *E. S. Bishop, M. D., F. A. C. P., professor of medicine, New York Polyclinic Medical School. The Macmillan Company, New York, 1920.*

In a small volume of some hundred and fifty pages, Dr. Bishop makes a plea for the rehabilitation of the so-called "drug fiend," taking the position that physicians and society generally have done gross injustice to drug addicts by imputing to them impaired will power, neurotic tendencies, moral obliquity, etc., whereas the bulk of them are normal people who have acquired a distinct disease which he thus defines * * * "a definite physical disease condition, presenting constant and definite physical symptoms and signs, progressing through clean-cut clinical stages of development, explainable by a mechanism of body protection against the action of narcotic toxins, accompanied if unskillfully managed by inhibition of function, autotoxiosis, and autotoxemia, its victims displaying in some cases deterioration and psychoses which are not intrinsic to

the disease, but are the result of toxemia and toxicosis, malnutrition, anxiety, fear, and suffering."

The author's contention would be more convincing to medical readers if it were supported by reports of pathological and laboratory research. However, the book is apparently intended, in the main, for the general reader, appealing to legislators and sociologists to view the narcotic drug addict as a victim rather than a criminal; as a person whose treatment should be protective, sympathetic, and humane, not punitive. If Dr. Bishop is right—one inclines to think so despite the absence of adduced proof—then a distinct modification of the public's attitude in this regard is called for; but it complicates the question of legitimate medical administration of opiates to realize that it is wholly the drug and in no sense a contributing defect in the makeup of the patient which leads to such deplorable results. It will remain for science to bring forth a simple and ready means of determining when a physical susceptibility exists analogous to that which makes certain people avoid eggs, fish, strawberries, etc.

The little volume reflects in its general get up the recent disturbed situation of bookmaking in New York, nor can we wholly agree with the publisher's assertion regarding the writer's lucidity.

DISEASES OF THE CHEST AND THE PRINCIPLES OF PHYSICAL DIAGNOSIS, by G. W. Norris, A. B., M. D., and H. R. M. Landis, A. B., M. D., *assistant professors of medicine, University of Pennsylvania. Second edition.* W. B. Saunders Co., Philadelphia, Pa., 1920.

It is most flattering to the authors, and a matter of congratulation also to their publishers, that the exhaustion of the first edition (1917) has necessitated a second which is now offered to the public. revised and enlarged by nearly 100 additional pages of text devoted to several conditions, such as spirochetal bronchitis, streptococcus empyema, etc., not discussed in the original volume.

SHELL-SHOCK AND OTHER NEUROPSYCHIATRIC PROBLEMS, by E. D. Southard, M. D., Sc. D., *professor of neuropathology, Harvard Medical School.* W. M. Leonard, Boston, Mass., 1919.

This is a collection of nearly 600 case histories of different types of war neurosis culled from over 2,000 reports which have appeared in the current medical literature of Europe. The histories have been carefully digested and classified with reference to character, causation, and treatment. An epitome of the case appears in heavy type above each one. A bibliographical index prepared by Norman Fenton, S. B., A. M., forms an appendix to the work. The book is an instructive and valuable digest of clinical information on war neurosis and the case-history method has advantages as well as disadvantages. Its cost and bulk make it unattractive to the undergraduate and to the general practitioner and yet for both these types of student the volume offers a very practical method of acquiring a comprehension of the subject.



VOL. XIV

NO. 3

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DEPARTMENT OF THE SERVICE

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This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume I, No. 1, April, 1907.
Volume II, No. 1, January, 1908.
Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
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TABLE OF CONTENTS.

	Page.
PREFACE	v
NOTICE TO SERVICE CONTRIBUTORS	vi
SPECIAL ARTICLES:	
HISTORY OF THE U. S. NAVAL HOSPITAL, CHELSEA, MASS. By Captain N. J. Blackwood, Medical Corps, U. S. N.....	311
INSTRUCTION FOR THE 'HOSPITAL CORPS. By Lieutenant Commander W. M. Kerr, Medical Corps, U. S. N....	338
STUDY OF TWO CASES OF DIABETES MELLITUS. By Lieutenant L. F. Craver, Medical Corps, U. S. N.....	345
FLAT FOOT IN THE NAVY. By Lieutenant C. F. Painter, Medical Corps, U. S. N. R. F....	359
STATIC DEFECTS OF THE LOWER EXTREMITIES. By Lieutenant A. A. Marsteller, Medical Corps, U. S. N.....	365
TREATMENT OF MALARIA. By Lieutenant Commander W. H. Michael, Medical Corps, U. S. N.....	367
NAVY RECRUITING. By Lieutenant W. H. Cechla, Medical Corps, U. S. N.....	371
HISTORICAL:	
AMERICAN FOUNDERS OF GYNECOLOGY	373
EDITORIAL:	
"BRING FORTH YOUR DEAD"—IS EDUCATIONAL PROPHYLAXIS EFFEC- TIVE	381
WILLIAM MARTIN—JOHN WOLTON ROSS—OLIVER DWIGHT NORTON, JR..	389
CLINICAL NOTES:	
INTERDENTAL LIGATION FOR JAW FRACTURES. By Lieutenant W. F. Murdy, Dental Corps, U. S. N.....	391
A TEMPORARY STOPPING. By Lieutenant Commander H. E. Harvey, Dental Corps, U. S. N..	394
ASCARIASIS AND APPENDICITIS. By Lieutenant Commander E. G. Hakansson, Medical Corps, U. S. N.....	394
MALARIAL CRESCENTS. By Lieutenant Commander W. H. Michael, Medical Corps, U. S. N..	395
POISONING BY JELLY FISH. By Commander A. H. Allen, Medical Corps, U. S. N.....	396
TRAUMATIC RUPTURE OF KIDNEY. By Lieutenant Commander F. H. Bowman, Medical Corps, U. S. N.....	397
A CASE OF ERYTHEMA MULTIFORME. By Lieutenant M. F. Czubak, Medical Corps, U. S. N.....	399
PROGRESS IN MEDICAL SCIENCES:	
GENERAL MEDICINE.—Static back trouble—Benzyl benzoate—Relation of anaphylaxis to asthma and eczema—High enema—Treatment of typhus—Thilerium hominis	401
MENTAL AND NERVOUS DISEASES.—Insanity as a defense in crime—The nervousness of the Jew—The Babinski reflex—Problems of delin- quency—Encephalomyelitis in Australia	408

PROGRESS IN MEDICAL SCIENCES—Continued.	Page.
SURGERY. —Radium—Surgery of peripheral nerves—Referred symptoms in diseases of gall-bladder and appendix—Intracranial pressure—Protection of the skin in surgical operations—Anesthesia from drugs administered by the mouth—A new skin-suture material—Roentgen-ray problems-----	414
HYGIENE AND SANITATION. —Birth control—Typhoid fever in vaccinated troops—Detection of typhoid carriers—Streptococci in market milk—Tuberculosis in San Francisco—An experiment in sanitary education—Oral hygiene—Differential diagnosis between trachoma and follicular conjunctivitis—Left-handedness—The Negritos of the Philippine Islands—Tropical Australia-----	425
NOTES AND COMMENTS:	
American Society for the Control of Cancer—Pay of Italian medical officers—The passing of the book worm—The neurotic girl—Control of druggists in Michigan—English statistics on alcoholism—Prevention of simple goiter—Value of quarantine against influenza in Australia—W. P. C. Barton, first chief of the Bureau of Medicine and Surgery—Information on blood-pressure estimation—Automobile accidents—Egyptian Medical School—Educational movement in U. S. Army-----	443
REPORTS:	
HEALTH CONDITIONS IN SANTO DOMINGO.	
By Lieutenant Commander G. F. Cottle, Medical Corps, U. S. N--	453
HISTORY OF U. S. S. <i>Pocahontas</i> DURING THE WAR.	
By Lieutenant Commander M. Boland, Medical Corps, U. S. N--	460
WITH THE AMERICAN PEACE COMMISSION.	
By Commander A. D. McLean, Medical Corps, U. S. N-----	500
TESTING WATER FOR STORAGE BATTERIES.	
Report from Naval Medical School Laboratory-----	502
BOOK NOTICES -----	505

PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

W. C. BRAISTED,
Surgeon General United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterhead, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

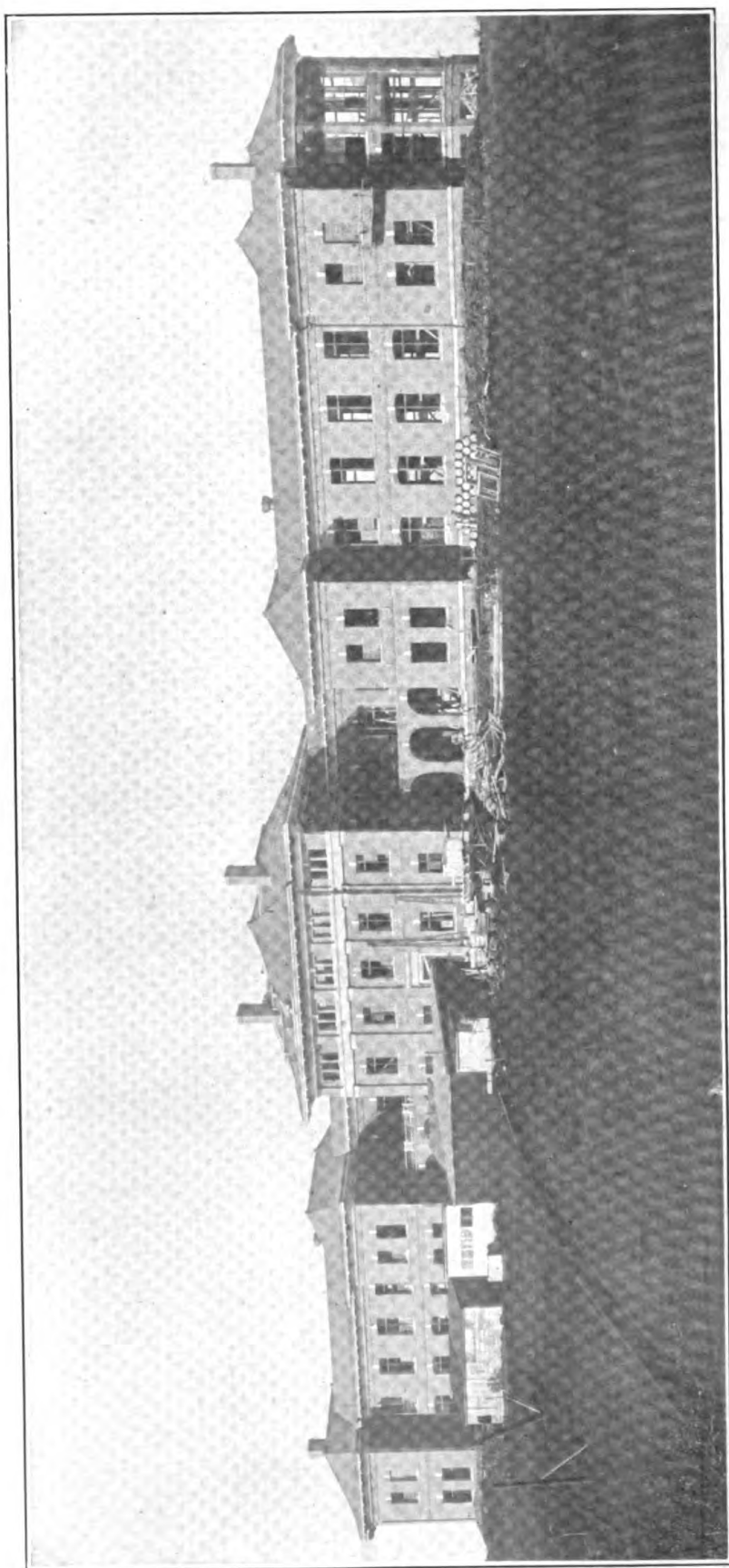
The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.



Front view of main buildings under construction, 1911. U. S. Naval Hospital, Chelsea, Mass.

U. S. NAVAL MEDICAL BULLETIN

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No. 3.

SPECIAL ARTICLES.

HISTORY OF THE U. S. NAVAL HOSPITAL, CHELSEA, MASS., 1915-1918.

By N. J. BLACKWOOD, Captain, Medical Corps, United States Navy.

OFFICES AND CLERICAL FORCE.

Prior to and during the early part of the period covered by this report the clerical work of the hospital was separated into two main divisions, one devoted to material and commissary and the other to personnel. Two offices, one for each division, sufficed for the clerical routine at that time and, until the early part of 1917, the following force proved fully adequate for the required work.

Material and commissary division :

- 1 pharmacist.
- 1 chief pharmacist's mate.

Personnel division :

- 1 chief pharmacist's mate.

The rapid growth of the Navy personnel from that time forth, with the increased clerical work which it entailed in every department of the Navy, was met for a short time at the hospital by increasing the force of each division by one yeoman (F), United States Naval Reserve Force. This proved but the beginning. The expansion of force progressed with the constantly multiplying amount of work until in the early part of 1918 the respective divisions were represented as follows:

Material and commissary division :

- 2 pharmacists.
- 1 chief pharmacist's mate.
- 4 yeomen (F).

Personnel division :

- 1 pharmacist.
- 1 chief pharmacist's mate.
- 16 yeomen (F).

During this process of expansion it was found necessary, in order to systematize the work of the latter division, to subdivide it into several sections, each devoted to specific routine work for which the division as a whole was responsible.

The increased personnel of each division naturally resulted in a congestion of the original offices and demanded an expansion of

office space. This was met in May, 1918, by devoting for the purpose a room which was originally the hospital laboratory, and another room formed by partitioning off a portion of the main floor rotunda. Space was allotted in the latter room for the branch post office at the hospital, which became practically a necessity in order to handle the constantly increasing volume of mail.

During this period of expansion the officer of the day's office, which was used jointly by all ward medical officers in writing up records, etc., became inadequate and its space was supplemented by partitioning off the side of the rotunda opposite the section already referred to as containing the post office.

Prior to the period covered by this report the pay accounts of the patients and enlisted duty personnel of the hospital were carried by the supply officer of the receiving ship at Boston, and the officers' and civilian employees' accounts by the disbursing officer of yard, Navy Yard, Boston. During the early stages of the expansion described herein it became apparent that the above method was an awkward one for all concerned, and recommendation was submitted to have a supply officer assigned to the hospital to handle affairs. This was eventually complied with and a pay office was established here July 1, 1919, with the following staff:

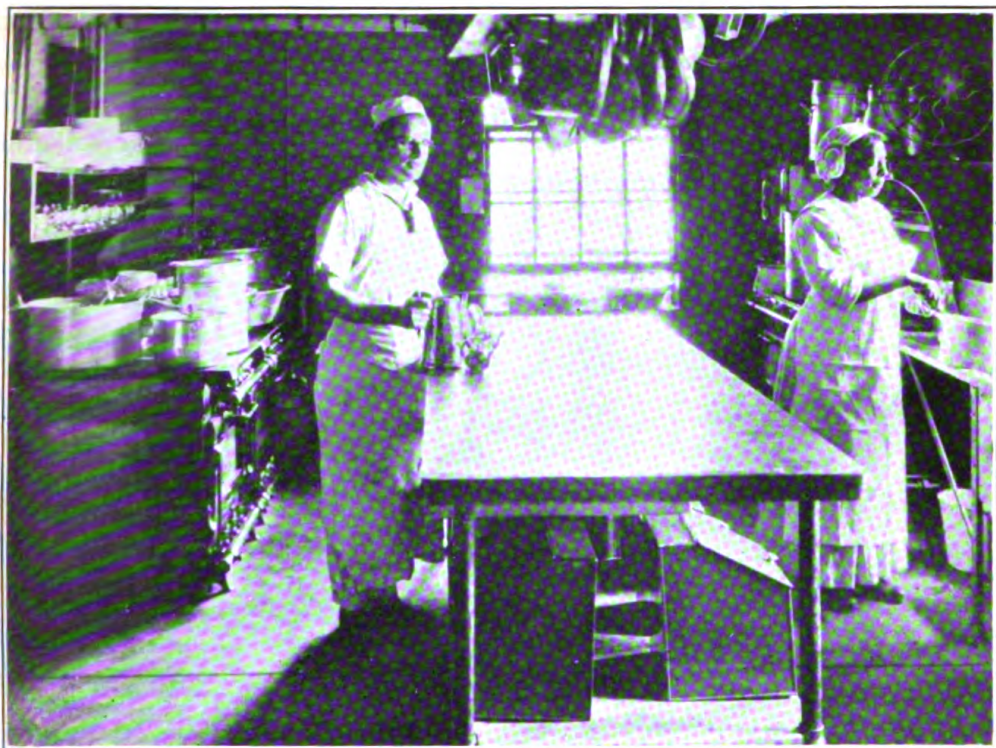
- 1 supply officer.
- 1 pay clerk.
- 4 yeomen (F), United States Naval Reserve Force.

On August 9, 1919, in conformity with a Navy Department order, all yeomen (F), United States Naval Reserve Force, mentioned herein were transferred to a civil-service status, each retaining her original office assignment.

Commissary department.—Consequent upon the increase in number of patients it became necessary to enlarge the commissary department to meet this increase. This was accomplished through the opening up of two new subsistence buildings, thus making a total of three where heretofore one had served the needs of the hospital. The following is the cost of rations for the four years. The effect of the constantly soaring prices of foodstuffs during the period is reflected in this table, but an item worthy of note is the highly desirable result obtained through the introduction of the cafeteria system, which eliminates waste and keeps the cost of rations at a comparatively low figure without impairing the rations served.

Average daily cost of ration:

Fiscal year 1915.....	\$0. 491
Fiscal year 1916.....	. 475
Fiscal year 1917.....	. 559
Fiscal year 1918 (cafeteria system).....	. 5395
Last six weeks prior to starting cafeteria.....	. 636
First six weeks subsequent to starting cafeteria.....	. 588



Main diet kitchen. U. S. Naval Hospital, Chelsea, Mass.



Main diet kitchen. U. S. Naval Hospital, Chelsea, Mass.



Main galley. U. S. Naval Hospital, Chelsea, Mass.



Ward "D." U. S. Naval Hospital, Chelsea, Mass.

Civilian employees.—The number of civilian employees carried on the rolls of the hospital has steadily increased with the development of the hospital. The opening of the additional subsistence buildings before mentioned has, to a large extent, been responsible for the increase in numbers of civilian employees. Following is the list showing this increase:

1915-----	31	1917-----	44
1916-----	34	1918-----	75

CONSTRUCTION.

The new hospital was put in commission April 24, 1915.

The new power plant was put in commission May 4, 1915.

Group I was started October 23, 1917, and put in commission on different dates. The hospital corps barracks was occupied during the week of April 29, 1918, the subsistence building, two wards, and laboratory during the week of May 13, and all the rest of the wards except the detention ward during the week of May 18.

Group II was started October 25, 1917, and put in commission during the week beginning September 1, 1918.

These groups consist of 19 wards, 2 subsistence buildings, 2 hospital corps quarters, a laundry, a laboratory, a garage, a bag and sterilizer building, and a Red Cross building.

On October 15, 1918, work was started on the new Group III. This group consists of 12 wards, subsistence building, hospital corps quarters, and receiving ward, and in the same contract and begun at the same time was ward 10 of Group I. The construction of this ward is the same as the rest of Groups I and II, except that it is a two-story building and contains 64 beds instead of 32, as do all the other wards in the temporary structures.

PERSONNEL AND PATIENTS.

DEVELOPMENT OF MEDICAL AND SURGICAL WORK IN THE HOSPITAL.

Nothing indicates so well the great increase which has occurred in medical work in this hospital as statistics which show the actual number of patients treated from year to year. Examination of the statistics shows that the number of patients under treatment between 1915 and the time of mobilization varied from 80 to 160. After mobilization the number treated in all branches of medicine and surgery gradually increased, until on December 29, 1917, the census showed 416 patients under treatment. From this time, war conditions made the increase much more rapid, until the maximum was reached during the influenza epidemic, when the census showed 1,247 patients on September 13, 1918.

The number of admissions to the hospital since 1914 is as follows:

1915:		1917:	
Remaining from 1914.....	145	Admitted	528
Admitted	945	Readmitted.....	2,688
1916:		1918:	
Remaining from 1915.....	139	Remaining from 1917.....	420
Admitted	985	Admitted	1,746
1917:		Readmitted.....	2,688
Remaining from 1916.....	117	Continued to 1919.....	681

It is needless to say that the great increase in number of patients to be treated, as indicated above, urgently required a corresponding expansion of quarters to house and care for these patients. This was provided for in large part by the temporary buildings of Group I and II, which increased the capacity of the hospital to approximately 800 beds. However, it was impossible to accommodate as many patients as resulted from the influenza epidemic of 1918. The facilities and services of 14 civilian hospitals of Boston were utilized in accordance with contracts made with them during the year, to care for the overflow of patients from the naval hospital.

Civilian hospitals.—In the early part of 1917, a survey was made of the hospital facilities of Boston and vicinity, with a view to establishing a naval hospital base, in accordance with directions of the Bureau of Medicine and Surgery. Each civilian hospital was carefully inspected and its environment and accessibility noted. As a result of this survey, formal agreements with the following hospitals were made and renewed for 1918:

	Number accommodated.	
	1917	1918
Massachusetts General Hospital, Boston.....	122	436
Boston City Hospital, Boston.....		80
St. Elizabeth's Hospital, Boston.....		106
Carney Hospital, Boston.....		278
Peter Bent Brigham Hospital, Boston.....		220
Deaconess Hospital, Boston (N. E. Deaconess' Association).....	23	145
Massachusetts Homeopathic Hospital, Boston.....	136	715
Massachusetts Charitable Eye and Ear Infirmary, Boston.....		10
Massachusetts Commission of Mental Diseases, Boston.....		22
Brooks Hospital, Boston.....		19
Cambridge Hospital, Cambridge.....	76	340
Faulkner Hospital, Jamaica Plain.....		45
Newton Hospital, Newton Lower Falls.....		148
Waltham Hospital, Waltham.....		80

The United States Marine Hospital became a member of the base by arrangements made in Washington.

All of these hospitals were considered adjuncts of the naval hospital, service records, health records, and statistical data being kept at the naval hospital.

The civilian hospitals were used in any emergency. They were used prior to the opening of the new groups and during the recent epidemic of influenza.

Medical officers from the staff of the naval hospital were detailed to care for the patients in the various civilian hospitals.

Increase in the personnel of the staff, nursing, and hospital corps has kept pace with the increase in number of patients. In 1915 the medical and surgical work of this hospital was well cared for by 7 medical officers. This number increased until in 1918, 64 medical officers reported for duty at the hospital for a part or all of the year. During the time of greatest activity the average number on duty at any one time varied between 40 and 50.

Below is recorded a list of all of the officers who were on duty at the hospital from 1915 to 1918, inclusive.

Medical officers, 1915.

George B. Wilson, Captain, United States Navy.
John T. Kennedy, Lieutenant Commander, United States Navy.
Wesley H. Rennie, Lieutenant Commander, United States Navy.
William N. McDonnell, Lieutenant, United States Navy.
Harold W. Smith, Lieutenant, United States Navy.
John M. Brister, Lieutenant Commander, United States Navy.
Renier J. Straeten, Lieutenant, United States Navy.
Frank Fulton, Pharmacist, United States Navy.

Medical officers, 1916.

George B. Wilson, Captain, United States Navy.
John M. Brister, Lieutenant Commander, United States Navy.
Harry Shaw, Lieutenant, United States Navy.
William N. McDonnell, Lieutenant, United States Navy.
Harold W. Smith, Lieutenant Commander, United States Navy.
Renier J. Straeten, Lieutenant, United States Navy.
Chester C. Wood, Lieutenant, United States Navy.
Lockhart D. Arbuckle, Lieutenant, United States Navy.
Phillip Leach, Captain, United States Navy.
Frank Fulton, Pharmacist, United States Navy.

Medical officers, 1917.

Phillip Leach, Captain, Medical Corps, United States Navy.
John M. Brister, Commander, Medical Corps, United States Navy.
Lee W. McGuire, Lieutenant Commander, Medical Corps, United States Navy.
Chester C. Wood, Lieutenant, Medical Corps, United States Navy.
Max M. Braff, Lieutenant (junior grade), Medical Corps, United States Navy.

- Wylie C. Mason, Lieutenant (junior grade), Medical Corps, United States Navy.
- Charles E. Morse, Lieutenant (junior grade), Medical Corps, United States Navy.
- Wilfred M. Peberdy, Lieutenant (junior grade), Medical Corps, United States Navy.
- Robert B. Team, Lieutenant (junior grade), Medical Corps, United States Navy.
- Joseph W. White, Lieutenant (junior grade), Medical Corps, United States Navy.
- William P. Williams, Lieutenant (junior grade), Medical Corps, United States Navy.
- Harry Shaw, Lieutenant, Medical Corps, United States Navy.
- Robert B. Greenough, Lieutenant Commander, Medical Corps, Naval Reserve Force.
- Milton J. Rosenau, Lieutenant Commander, Medical Corps, Naval Reserve Force.
- David A. Heffernan, Lieutenant, Medical Corps, Naval Reserve Force.
- Bertrand F. Andrews, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Augustus W. Dudley, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Ransom H. Holcomb, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Charles D. Padan, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Dallas Pond, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- John C. Roe, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Glen A. Sheppard, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Sigmund Simons, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Dudley D. Schoenfeld, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Horace P. Stevens, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Edwin W. York, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- V. H. Shields, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- W. H. H. Turville, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- W. J. Pennell, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- E. J. Lanols, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- W. E. Greenwood, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- R. W. Belknap, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- S. Segal, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.

R. J. Heffernan, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
M. P. Hanlon, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
L. W. Johnson, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
Morris S. Bender, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
Howard P. Griffin, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
Edwin P. Bugbee, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
Joseph A. Mangiaracina, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
Lawrence C. Chisholm, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
A. H. Dearing, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
J. W. S. Brady, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
R. P. Parsons, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
W. M. Anderson, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
J. A. Brown, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
R. D. Bussdicker, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
H. B. La Favre, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
N. C. Rubinsky, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
L. C. Thyson, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
Jesse W. Allen, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
A. H. Drane, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
B. L. Cunningham, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
Frank Fulton, Pharmacist, United States Navy.

Medical officers, 1918.

Philip Leach, Captain, Medical Corps, United States Navy.
John M. Brister, Commander, Medical Corps, United States Navy.
Lee W. McGuire, Lieutenant Commander, Medical Corps, United States Navy.
Chester C. Wood, Lieutenant, Medical Corps, United States Navy.
Robert B. Greenough, Lieutenant Commander, Medical Corps, Naval Reserve Force.
Milton J. Rosenau, Lieutenant Commander, Medical Corps, Naval Reserve Force.
David A. Heffernan, Lieutenant, Medical Corps, Naval Reserve Force.

- Horace P. Stevens, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Augustus W. Dudley, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Wilfred M. Peberdy, Lieutenant (junior grade), Medical Corps, United States Navy.
- Ransom H. Holcomb, Lieutenant (junior grade), Medical Corps, United States Navy.
- Bertrand F. Andrews, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Dallas Pond, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Glen A. Sheppard, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Dudley D. Shoenfeld, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- J. Jay Keegan, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- William R. Redden, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Robert G. Reaves, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Robert E. Cleary, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- A. J. A. Hamilton, Lieutenant (junior grade)*, Medical Corps, Naval Reserve Force.
- Sigmund Simons, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Ernest W. Goodpasture, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Eugene A. Vickery, Lieutenant Commander, Medical Corps, United States Navy.
- William H. Massey, Lieutenant Commander, Medical Corps, United States Navy.
- Frank Wehle, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Roscoe M. Waterhouse, Lieutenant (junior grade), Medical Corps, United States Navy.
- Harry F. Friedman, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Lincoln F. Sise, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Albert H. Aldridge, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Fred W. Granger, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Philip B. Becker, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Asel J. Bennett, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Franklin P. Dwinell, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Lawrence W. Ebehartner, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.

- Leon H. Griggs, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Clifford E. McElwain, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Joseph A. Meledy, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Harold G. Porter, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Donald D. Prentice, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Foster C. Rulison, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Hubert R. Stiles, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Leslie H. Wright, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Harrison H. Leffler, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Francis W. Carll, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- George E. Smith, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Alson R. Kilgore, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Fresenius Van Nuys, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Gordon T. Courtney, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- William L. Cowles, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Harold C. Bean, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Frederick H. Rapoport, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Walter N. Rowley, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Norman J. Blackwood, Captain, Medical Corps, United States Navy.
- Francis L. Burnett, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Joseph McDonald, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Frank A. Shuffelton, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Saul S. Soloway, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- David E. Eisenberg, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Ellis E. Foster, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Harold R. Lucas, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.
- Royal J. Calcote, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.

John M. Wilcox, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.

Charles F. Painter, Lieutenant (junior grade), Medical Corps, Naval Reserve Force.

Chalmer H. Weaver, Lieutenant Commander, Medical Corps, United States Navy.

Frank Fulton, Lieutenant (T), Medical Corps, United States Navy.

Arthur J. Larson, Pharmacist, Medical Corps, United States Navy.

Ertel E. Weaver, Pharmacist, Medical Corps, United States Navy.

Henry P. Knowles, Pharmacist, Medical Corps, United States Navy.

NURSES AND HOSPITAL CORPS.

The increase in the personnel of the Nurse and Hospital Corps is indicated by the following statistics showing the number of nurses who reported for duty each year from 1915 to 1918, inclusive:

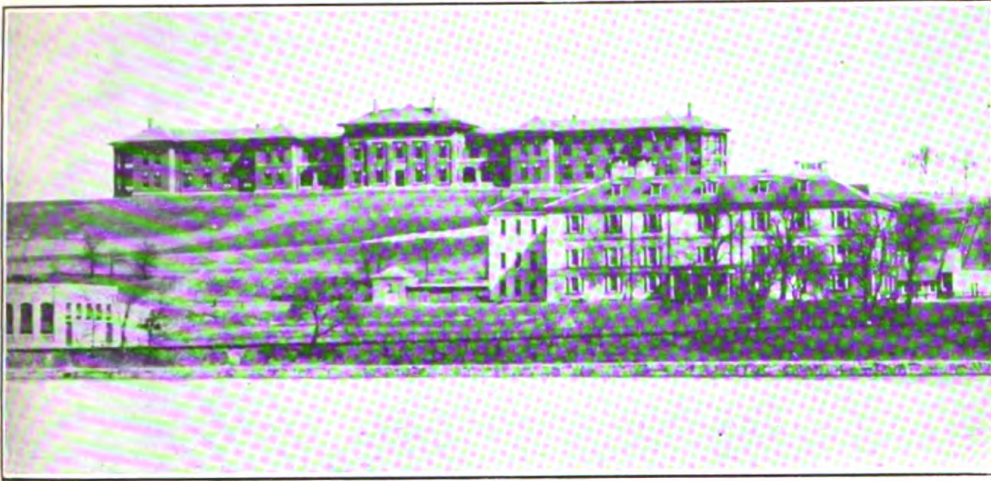
Nurse Corps.

1915.....	17	1917.....	42
1916.....	20	1918.....	70

Hospital Corps.

	Chief pharma- cist's mate.	Pharma- cist's mate, class 1.	Pharma- cist's mate, class 2.	Pharma- cist's mate, class 3.	Hospital appren- tice, class 1.	Hospital appren- tice, class 2.
1915.						
On board Jan. 1, 1915.....	4			13		7
Reported for year.....	5			19		10
Transferred during year.....	5			20		9
Remaining Dec. 31, 1915.....	4			12		8
1916.						
On board Jan. 1, 1916.....	4			13		8
Reported for year.....	4			13		11
Transferred during year.....	4			18		5
Remaining Dec. 31, 1916.....	4		5	8	6	14
1917.						
On board Jan. 1, 1917.....	4	2	5	8	6	3
Reported for year.....	4	1	8	1	54	67
Transferred during year.....	5	2	7	7	46	40
Remaining Dec. 31, 1917.....	3	1	6	2	14	30
1918.						
On board Jan. 1, 1918.....	3	1	7	2	14	31
Reported for year.....	3	0	56	24	6	9
Transferred during year.....	2	1	4	5	19	59
Remaining Dec. 31, 1918.....	4	0	59	21	1	68

As the number of patients to be treated increased, thorough organization of the medical work under various departments became very important. The cooperation of these departments contributed largely to the efficiency and good results obtained even under the most strained conditions. All patients admitted to the hospital



View from the water front. U. S. Naval Hospital, Chelsea, Mass.



Nurses' quarters. U. S. Naval Hospital, Chelsea, Mass.



Property storeroom. U. S. Naval Hospital, Chelsea, Mass.



Linen room. U. S. Naval Hospital, Chelsea, Mass.

come under the care of one of two major divisions, medical or surgical. The medical division is divided into services for the care of general medical work, tuberculosis, contagious diseases, and psychiatry. The surgical division has services for the care of general surgical cases, orthopedic, genito-urinary, and eye, ear, nose, and throat work. The hospital has also been provided with a well-equipped dental office with two chairs.

A brief report of the work in each of the various departments will be given to show the enormous growth in the amount of medical and surgical work done in all branches. This report will also indicate the character of the work which has been done and results obtained.

DEATHS OF MEDICAL OFFICERS AND NURSES.

During the influenza epidemic of 1918-19, two medical officers and three nurses who were victims of influenza and pneumonia lost their lives.

The officers who died were:

Harold G. Porter, Lieutenant, junior grade, Medical Corps, United States Naval Reserve Force.

Gordon T. Courtney, Lieutenant, junior grade, Medical Corps, United States Naval Reserve Force.

The nurses who died were:

Miss Constance Martin.

Miss Vera M. Rockwell.

Miss Maria Trimble.

Dr. Courtney was on duty at this hospital until September 12, 1918. During the severe part of the influenza epidemic, and even before being detached to report to the U. S. S. *America*, he showed some signs of influenzal infection, so that he had scarcely reported for duty on the U. S. S. *America* before he came down with a broncho-pneumonia, which proved fatal on September 23, 1918. For these reasons he is included in our hospital record.

MEDICAL DEPARTMENT.

Statistics showing the comparative number of cases treated by the various branches of the medical service during each year could not be obtained except in the case of the contagious service. The following statistics show the great increase in the number of certain types of contagious diseases:

	1915.	1918.
Diphtheria.....	1	192
Measles.....	3	82
German measles.....	2	90
Mumps.....	36	588
Scabies.....	3	137
Scarlet fever.....	3	65

The statistics given above do not represent cases resulting from definite epidemics, except in the case of mumps. The 588 cases reported for 1918 represent the results of an epidemic of mumps in the First Naval District in 1918. Statistics of the other types simply indicate the more normal and gradual increase in number of cases coming under treatment before and after mobilization. These statistics serve to show also the problem which the hospital had to meet in this one important branch of the medical service. A corresponding increase has occurred in the number of patients in all other branches.

Statistics could not be obtained to show the number of cases admitted to each branch of the medical service during the entire period of this report. However, a record of the number of admissions of the most important types of cases treated in 1918 will serve to show the character of work being done and something of the results obtained. This report will include a record of the cases of influenza which resulted from the epidemic of 1918.

Record of influenza epidemic.

Cases admitted.....	2,593
Cases of broncho-pneumonia as a complication of influenza.....	584
Total deaths from pneumonia.....	167
Percentage of deaths.....	28.5

During this epidemic, original work was done on the treatment of broncho-pneumonia by the use of convalescent human serum by Lieutenant Commander Lee W. McGuire and Lieutenant William R. Redden, Medical Corps, United States Navy. The epidemic began on August 27, 1918. Up to October 1, 434 cases of influenza pneumonia developed. Of this number, 161 died, giving a death rate of 37 per cent. After October 1 all influenza-pneumonia patients received convalescent human serum treatment. Pneumonia cases to the number of 151 were treated, with 6 deaths, giving a mortality of 4 per cent. This treatment proved curative in all uncomplicated cases, except where patients were received practically moribund.

Type I pneumonia.—During the period of this report, 25 cases of Type I lobar pneumonia have been treated. One death occurred from empyema which complicated the pneumonia. All cases with the one exception recovered promptly after treatment with the Type I serum. The serum is believed to be absolutely curative in uncomplicated cases of this type of pneumonia.

Type II pneumonia.

Total cases.....	10
Deaths.....	1
Mortality, per cent.....	10

Good results were obtained from Type II serum, but prompt recovery did not occur. Two to four 100 c. c. injections were usually necessary.

Type III pneumonia.—One case with recovery.

Type IV pneumonia.

Total cases.....	39
Deaths.....	2
Mortality, per cent.....	5.1

Hemolytic streptococcic pneumonias.

Total cases.....	23
Deaths.....	9
Mortality, per cent.....	39

In the streptococcic pneumonias, empyema was a very common early complication, requiring aspiration or some form of drainage. Early rib resection was attempted, but was followed by bad results. Repeated aspiration was then tried with far better results. Rib resection was resorted to later when necessary.

A report of cases treated by the contagious service in 1918 was given above. Three deaths from measles occurred from complications, as follows:

Broncho-pneumonia.....	2
Miliary tuberculosis.....	1

Tuberculosis.—A special ward has been maintained for the diagnosis and disposition of tubercular cases. The following cases were admitted in 1918:

Tuberculosis, chronic pulmonary.....	92
Tuberculosis, acute pulmonary.....	9
Acute pulmonary miliary tuberculosis.....	3
Acute general miliary tuberculosis.....	1
Tuberculosis, acute-broncho pneumonia.....	3
Tuberculosis, larynx.....	1
Tuberculosis, unqualified.....	4
	113

Disposition of the above cases was as follows:

Transferred to sanatoria for treatment.....	37
Invalided from service.....	29
Died.....	7
Change of diagnosis.....	25
Discharged from service.....	15

Psychiatry.—The cases admitted were as follows:

Dementia præcox.....	11
Manic depressive.....	11
Hysteria.....	6
Psychosis:	
1. Traumatic.....	1
2. Exhaustive.....	2

Neurasthenia	1
Constitutional inferiority	6
Epilepsy	7
General paresis	1

This does not include 6 cases sent here for observation, who were discharged to duty.

Disposition of these cases was as follows:

To Government hospital for insane.....	11
To State institutions.....	3
In custody of family.....	6
Discharged from service.....	15
Returned to duty.....	16
Died	1

52

SURGICAL DEPARTMENT.

All surgical work at the hospital is done in the main building, except for one ward in Group I, which is used for the care of convalescent cases. Until 1918, one ward in the main hospital building was used for genito-urinary work. However, after the transfer of 96 genito-urinary patients to the United States Naval Hospital, Portsmouth, N. H., this ward was turned over to a newly organized orthopedic department, under Lieutenant Charles F. Painter, Medical Corps, U. S. N. R. F., so that only surgical cases were treated in the main hospital, except for those in the sick officers' quarters.

An examination of the records of the surgical service during the period of this report shows that the cases presented for surgical treatment included:

1. All the more common acute surgical diseases and injuries.
2. A few chronic conditions which could be relieved by surgical measures.

Statistics are given below to show the comparative number of major operations done for a period of three years:

Major operations.

1916	226
1917	512
1918	452

A list of the operations done in 1918 is also given below to show the type of cases which are most commonly presented for treatment during the course of one year.

Operations, 1918.

Appendicitis:

Acute, drained	35
Acute, not drained.....	29
Chronic.....	96
—	160

Herniæ :

Inguinal	94	
Ventral	15	
Umbilical	1	
Femoral	1	
Epigastric	2	
	—	113
Meckel's diverticulum	1	
Varix	25	
Varicocele	60	
Hydrocele	10	
Fractured skull (decompression)	1	
Brain tumor (decompression)	1	
Hallux valgus	6	
Semilunar cartilage	2	
Duodenal ulcer (P. G. E.)	11	
Cholelithiasis (cystectomy)	3	
Pyloroplasty for spasm	1	
Amputations :		
Leg	3	
Arm	2	
	—	5
Fractures, open reduction :		
Bone plate, femur	1	
Bone plate and bone graft, humerus	1	
	—	2
Empyema :		
Rib resection	33	
Intercostal drainage	13	
	—	46
Transfusion	4	
Nephrectomy	1	
	—	
Total		452

During this period there were also many cases in the surgical wards who received surgical treatment but upon whom no operation was performed, such as fractures, sprains, bruises, burns, and similar injuries.

An interesting series of cases was treated during 1918 for streptococcic empyema. It was found necessary to revise the previously accepted views in regard to immediate drainage by rib resection. Patients were unable to withstand even the minor operation of rib resection under local anesthesia. This procedure was therefore abandoned and in its place the technique of early and repeated aspiration was used. This was followed later by negative pressure drainage by means of an intercostal tube and irrigation with Dakin's solution. Good results followed this method of treatment.

GENITO-URINARY SERVICE.

As in all military organizations, the work of this service has been very important. Although the genito-urinary service has always been more or less independent, it was made a distinct branch of the surgical department in 1918.

Statistics could not be obtained to give a comparison of the number of cases treated during each year covered by this report. However, the following will give some idea of the work done:

1915:

Syphills—

Admitted	cases..	136
Carried over from previous year.....	do.....	21

Gonorrhea—

Admitted.....	do.....	79
Carried over from previous year.....	do.....	17

1916: Intravenous salvarsans and neo-salvarsans given..... 399

1917: Intravenous salvarsans and neo-salvarsans given..... 400

1918:

Gonorrhea treated.....	cases..	607
------------------------	---------	-----

Syphills treated.....	do.....	332
-----------------------	---------	-----

The genito-urinary work was done in wards C and E of the main hospital building until 1918, when the patients were moved to Portsmouth, N. H., to make room for the department of orthopedic surgery, as previously noted. Conditions eventually made it advisable to move these patients to Group I and later to Group II, where most of the work is being done at present. The work of the genito-urinary department has been much facilitated by the acquisition of new instruments and equipment. The department is now provided with examining and operating cystoscopes and high-frequency apparatus for intravesical cauterization. This additional equipment has allowed more thorough study of many cases of persistent urethral discharge. The discharge in several of these cases supposed to have been due to a chronic gonorrhea has been found to be due to papillomatous growth in the posterior urethra and at the neck of the bladder. Removal of these growths by use of a high-frequency current has given good results.

DISEASES OF EYE, EAR, NOSE, AND THROAT.

Before the declaration of war, diseases of the eye, ear, nose, and throat were not carried under a special service. Cases requiring special attention were seen in consultation by Dr. David A. Heffernan. With the declaration of war, Dr. Heffernan was enrolled and given charge of this work. At first, one ward was sufficient; but in January, 1918, a second ward was added and later in the same year a third.

Admissions for diseases of eye, ear, nose, and throat:

1917	800
1918	1,700
1919 (8 months)	1,200

Diseases of the tonsils formed the largest percentage, deviated septum the next, followed closely by middle-ear disturbances. These formed about 75 per cent of the admissions.

Most of the admissions for tonsillar disease were of the acute follicular type. Vincent's angina at times was almost epidemic. This disease can be so easily mistaken for syphilis that a Wassermann should always be done.

Only one death occurred in the service. This was due to a streptococcus pneumonia, complicating a mastoid.

Diseases of the accessory nasal sinuses were mostly of the acute type and yielded readily to treatment. Two cases of atrophic rhinitis were surveyed.

Diseases of the eye were mostly of a refractive nature, plus a few syphilitic complications.

Operations in this department:

	Mastoid.	Tonsils.	Septums.	Total.
1917, April to Dec. 31.....	12	150	150	312
1918, January to Dec. 31.....	20	189	290	499
1919, January to September.....	42	158	297	507

In addition to the above, since the declaration of war, there have been 19 radical maxillary sinus operations and 1 radical frontal. There have also been two enucleations of the eye, one following the removal of a large piece of steel from the globe and the other following the rupture of the sclera due to a blow.

The out-patient clinic averaged about 15 patients a day, the cases being about equally divided between refraction of eyes and defective ears.

Tonsillectomy in about 95 per cent of the cases was done under local anesthesia, 1 per cent novocain in 1 to 4,000 adrenalin solution being used. Septum operations were done entirely under local anesthesia.

X-RAY DEPARTMENT.

The following statistics show a summary of the work done by the X-ray department since 1915:

	1915	1916	1917	1918
Plates exposed.....	339	486	1,122	10,500
Dental films.....	21	.....	257	795
Bismuth series.....	19	.....	19	232

The above statistics indicate the great increase in work done by this department from year to year.

A summary of the cases is given below for 1918 to show the usual types of cases which are presented for X-ray examination during the course of one year.

Approximately 10,500 plates were exposed in handling a total of 3,565 cases. The regions X-rayed were classified as follows:

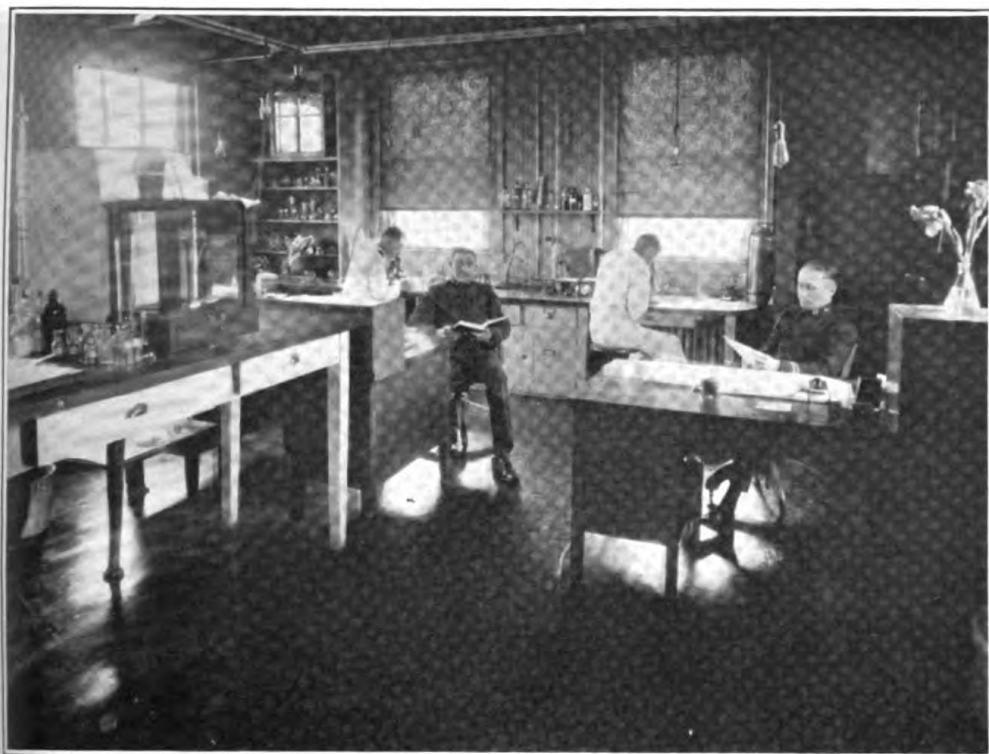
Head.....	102	Ribs.....	12
Sinuses and antrums.....	104	Kidney.....	52
Mastoids.....	76	Gall-bladder.....	18
Nose.....	6	Ureter.....	6
Jaw.....	61	Bladder.....	17
Teeth.....	795	Stomach.....	232
Clavicle.....	56	Pelvis.....	10
Scapula.....	4	Sacro-iliac.....	48
Shoulder.....	76	Hip.....	40
Humerus.....	46	Femur.....	33
Forearm.....	56	Leg.....	79
Elbows.....	88	Knee.....	129
Wrists.....	106	Ankle.....	145
Hands.....	216	Feet.....	101
Chests.....	735		
Spine.....	116	Total.....	3,565

Much new equipment was obtained during 1918 to facilitate the work of this department. The department is now equipped not only to make X-ray examinations, but also to carry out treatment by X-ray.

REPORT OF LABORATORY WORK.

The following statistical summary shows a comparison of the number of some of the usual laboratory procedures performed since 1915.

	1915	1916	1917	1918
Wassermann reactions.....	2,473	1,721	1,885	4,153
Blood counts.....	187	154	409	2,838
Malaria and differential.....	162	135		
Malaria smears.....				61
Urine examinations.....	1,812	736	736	10,730
Sputum examinations.....	40	79	344	1,165
Stomach analyses.....	18	8	1	53
Throat cultures.....	53	18	475	5,200
Gonococcus smears.....	520	330	431	1,000
Typhoid prophylaxis (given).....	11	6	55	
Autogenous vaccines (made).....	18	12	11	53
Pathological sections.....	12			122
Widal.....		2	6	32
Examinations of spinal fluid.....		9	30	308
Examinations of feces.....		30	105	236



Laboratory. U. S. Naval Hospital, Chelsea, Mass.



Laboratory. U. S. Naval Hospital, Chelsea, Mass.



It is plain to be seen from this summary that the increase in laboratory work has been immense. This demanded larger quarters, which were adequately provided by one of the buildings of Group I. A great increase in the personnel of the laboratory force was also necessary. Much new and needed equipment has been added to facilitate the work of the laboratory.

A complete statistical summary is given below for 1918. This shows the amount and character of work done during a year after mobilization, when the medical and surgical work of the hospital was most active.

Routine examinations for 1918.

Leucocyte count	2, 715
Red blood cell and hemoglobin	123
Malaria smears	61
Blood typing for transfusion	7
Serum compatibility tests	1, 400
Widal, microscopic	32
Blood quantitative analysis	11
Wassermann tests	4, 153
Urine examinations	10, 730
Urethral smears	1, 000
Dark-field examinations	84
Pleural fluid	391
Ascitic fluid	4
Spinal fluid	308
Throat cultures for diphtheria	4, 435
Throat smears for Vincent's angina	765
Naso-pharyngeal cultures for meningococcus	5, 950
Sputum for bacillus tuberculosis	954
Bacillus diphtheriæ virulence test	7
Sputum for pneumococcus typing	211
Gastric contents analysis	53
Feces examination	236
Pus examination	209
Autogenous vaccines	53
Milk analysis	17
Dakin's solution preparation	50
Water analysis	1
Surgical pathology	122
Autopsies	78
Total	35, 160

During the winter of 1918 the laboratory and medical department cooperated in doing research work and making investigations along various medical lines. This work was continued into 1919. The results of this work, which was done for the most part during the influenza epidemic, may be found in the following articles:

1. Etiology and Mode of Transmission of Influenza. By M. J. Rosenau and J. J. Keegan.
2. An Experiment with Influenza Bacillus Vaccine. By M. J. Rosenau and J. J. Keegan.

3. The Prevailing Pandemic of Influenza. By J. J. Keegan.
4. Pathology of Influenza Pneumonia. By E. W. Goodpasture and F. L. Burnett.
5. Complement-fixation with Influenza Pneumonia Sera. By F. H. Rapoport.
6. Convalescent Serum Treatment of Influenza Pneumonia. By L. W. McGuire and W. R. Redden. 1918, preliminary report; 1919, final report.
7. Meningococcus Carriers. By W. R. Redden.
8. Serum Treatment in Lobar Pneumonia. By W. R. Redden.
9. Cutaneous Diphtheria. By J. J. Keegan.
10. Anatomy and Physiology of Meninges, Choroid Plexus and Cerebro-spinal Fluid. By J. J. Keegan.
11. Diphtheria Outbreak on the U. S. S. *Pueblo*. By D. D. Shoenfeld.

STAFF MEETINGS.

A meeting of the hospital staff is held once each week. The purpose of this meeting is twofold. In the first place an opportunity is given to the officers of the staff to offer suggestions and to discuss means of improvement in the management and routine of the hospital. Also, at each meeting, a paper is read by a member of the staff on some subject in which he has been particularly interested along medical or surgical lines, as the case may be. Reports of cases are given and patients showing interesting medical or surgical conditions are presented at the meeting for observation and discussion.

ADMISSIONS FOR 1918.

The following list of admissions of all cases for 1918 is given to show the character of cases presented for treatment during a year of the war when medical and surgical work was very active:

Diagnosis.	Cases.	Diagnosis.	Cases.
Abscesses.....	157	Antiinoculation, typhoid.....	
Acne.....	6	Balanoposthitis.....	1
Addison's disease.....	1	Blepharitis.....	
Adenoids.....	9	Bronchitis.....	20
Adhesions.....	18	Bursitis.....	1
Albuminuria.....	2	Calculus.....	
Amaurosis.....	3	Callositas.....	
Amblyopia.....	2	Carbuncle.....	
Amputation stump.....	8	Caries of tooth.....	
Anemia, simple.....	3	Cataract.....	
Aneurism.....	2	Cellulitis.....	5
Angina pectoris.....	1	Cerebro-spinal fever.....	1
Ankylosis of joint, jaw.....	2	Cerumen, accumulation.....	
Antiinoculation, unqualified.....	2	Chalazion.....	
Aortitis.....	1	Chancroid.....	5
Angina ludovici.....	1	Chancroid of lymphnode.....	
Appendicitis.....	227	Chicken pox.....	1
Arteriosclerosis, general.....	4	Cholangitis, acute.....	2
Arthritis.....	48	Cholecystitis.....	
Asthma.....	8	Cholelithiasis.....	
Astigmatism.....	9	Chorea.....	
Atrophy of nerve, optic.....	1	Choroiditis.....	
Autointoxication, intestinal.....	12	Cicatricial contractions.....	

Diagnosis.	Cases.	Diagnosis.	Cases.
Colitis, acute.....	2	Herpes.....	3
Conjunctivitis.....	23	Hordeolum.....	2
Constipation.....	27	Hydrocele.....	13
Constitutional inferiority.....	24	Hyperchylia.....	3
Constitutional psychopathic state.....	8	Hemiplegia, old.....	1
Contractures.....	3	Hypermetropia.....	3
Cicatrix of skin.....	1	Hypertrophy.....	122
Curvature of spine.....	4	Hypochlorhydria.....	3
Cystoma.....	3	Hypochondriasis.....	1
Deafness.....	3	Hysteria.....	17
Deformity of nose, acquired.....	8	Impetigo, contagiosa.....	2
Dementia.....	17	Incontinence of urine.....	14
Dentition.....	2	Influenza.....	2,582
Dermatitis.....	15	Ingrown nail.....	17
Deviation of nasal septum.....	194	Insomnia.....	1
Diabetes mellitus.....	4	Iridochoiriditis.....	1
Diagnosis undetermined.....	679	Iridocyclitis.....	1
Dilation, acute cardiac.....	1	Iritis.....	11
Dacryocystitis.....	1	Jaundice, acute infective (Weil's disease).....	3
Diphtheria.....	203	Keratitis.....	10
Duodenitis.....	5	Laryngitis.....	16
Dysentery.....	3	Leukoma.....	2
Dysidrosis.....	2	Lipoma.....	2
Eczema.....	14	Locomotor ataxia.....	2
Endocarditis.....	19	Loose body in joint.....	3
Enteritis.....	8	Lymphadenitis.....	25
Epididymitis.....	10	Lymphangitis.....	5
Epilepsy.....	16	Malaria.....	19
Epithelioma.....	2	Malformations, congenital.....	5
Erysipelas.....	16	Malingering.....	2
Erythema nodosum.....	2	Mastoiditis.....	42
Emphysema, pulmonary.....	1	Measles.....	136
Eustachian.....	5	Melancholia, involutional.....	2
Exophthalmic goiter.....	4	Meningitis.....	18
Fever of unknown cause.....	3	Metatarsalgia.....	2
Fibroma, right breast.....	2	Migraine.....	1
Fissure of anus.....	4	Mixed malignant tumor.....	1
Fistula.....	26	Mumps.....	609
Foreign body, eye.....	2	Myocarditis.....	18
Furunculosis.....	27	Myopia.....	2
Gastritis.....	29	Myositis, acute.....	4
Gastroduodenitis.....	4	Nausea marina.....	5
Gastroenteritis.....	16	Necrosis.....	1
Gastroptosis.....	2	Nephritis.....	31
German measles.....	106	Nephrolithiasis.....	3
Glaucoma, acute.....	1	Nervous dyspepsia.....	5
Glioma of brain.....	1	Neuralgia.....	6
Glossitis, acute.....	1	Neurasthenia.....	38
Glycosuria.....	4	Neuritis.....	10
Goiter.....	10	Neuroma.....	1
Gonococcus infection.....	607	Neuro-retinitis.....	2
Hallux valgus.....	12	Neurosis.....	6
Hammer toe.....	8	No disease.....	150
Hay fever.....	2	Obstruction, acute intestinal.....	2
Heart block.....	1	Odontoma.....	2
Hematoma.....	2	Onychia.....	1
Hematuria, renal.....	4	Orchitis.....	24
Hemophilia.....	1	Osteoarthritis, hypertrophic.....	1
Hemoptysis.....	1	Osteoma.....	5
Hemorrhage.....	4	Osteomyelitis.....	6
Hemorrhoids.....	97	Otitis.....	252
Hernia.....	160		

Diagnosis.	Cases.	Diagnosis.	Cases.
Oxyuriasis.....	1	Sudamina.....	30
Palpitation, cardiac.....	1	Tachycardia.....	1
Papilloma.....	2	Teniasis.....	
Paralysis.....	10	Tenosynovitis.....	
Paranoidstate.....	1	Thrombosis.....	
Pediculosis.....	2	Tonsillitis.....	66
Pericarditis.....	4	Trachoma.....	
Periostitis.....	8	Trichiniasis.....	
Pes cavus.....	1	Trichophytosis.....	
Pes planus.....	36	Tuberculosis.....	13
Pharyngitis, acute.....	33	Typhoid fever.....	
Phimosis.....	27	Ulcers.....	4
Phlebitis.....	8	Ulceromembranous angina.....	7
Pemphigus.....	1	Uncinariasis.....	
Paratyphoid fever.....	1	Union of fracture faulty.....	
Perichondritis of auricle.....	1	Ureteral colic.....	
Pityriasis, rosea.....	3	Urethritis, acute (non ven).....	
Pleurisy.....	144	Urticaria.....	
Pleuritic adhesions.....	3	Vaccinia.....	
Pneumonia.....	345	Valvular disease, chronic cardiac.....	4
Pneumothorax.....	1	Varicocele.....	7
Poliomyelitis, acute anterior.....	2	Varix.....	3
Polypus, nasal.....	5		
Proctitis.....	1	INJURIES.	
Prostatitis.....	3	Abrasions.....	
Pruritus.....	3	Burns.....	1
Psoriasis.....	10	Contusions.....	3
Psychasthenia.....	6	Dislocations.....	2
Psychosis.....	23	Epiphyseal separation.....	
Pterygium.....	7	Crush.....	
Pyelitis.....	7	Diagnosis undetermined.....	
Pyelonephritis.....	1	Exhaustion from over-exertion.....	
Pyorrhea alveolar.....	6	Foreign body, traumatic.....	
Redundant prepuce.....	30	Fractures.....	18
Retention cyst.....	3	Intracranial injury.....	
Retinitis.....	2	Multiple injuries extreme.....	
Rheumatic fever.....	156	Sprain.....	5
Rheumatism.....	49	Strain.....	2
Rhinitis.....	23	Sunstroke.....	
Rupture of urethra.....	1	Synovitis, traumatic.....	3
Sarcoma.....	3	Wounds.....	10
Scabies.....	159		
Scarlet fever.....	62	POISONS.	
Senility.....	1	Acute:	
Septicemia.....	2	Alcoholic.....	1
Sinus.....	11	Gasoline fumes.....	
Sinusitis.....	59	Food.....	
Spasm of rectum.....	1	Heroin.....	
Spur of nasal septum.....	1	Iodine.....	
Stammering.....	1	Bichloride of mercury.....	
Staphyloma of cornea.....	1	Ptomaine.....	
Stomatitis.....	5	Chronic morphine.....	
Stricture of urethra.....	10	Illuminating gas.....	
Strongyloides, intestinal.....	1	Anesthesia (ammonia).....	

DEATHS.

The number of deaths at this hospital from all causes from 1915 to 1919 is as follows:

1915.....	9	1917.....	24
1916.....	11	1918.....	242

Causes of death for 1915 were as follows:

Appendicitis, acute	2
Burns, multiple	1
Abscess of liver	1
Nephritis, acute	2
Nephritis, chronic parenchymatous	1
Pneumonia, lobar	1
Tuberculosis, acute broncho-pneumonic	1
Total	9

A record of the causes of deaths for 1916 and 1917 could not be obtained. The following is a record of deaths for 1918:

Multiple injuries	2
Skull fracture, meningeal hemorrhage	1
Burns	2
Malignant disease	2
Lacerated wound of knee and septicemia	1
Septicemia, unknown origin	1
Septicemia, following cellulitis of neck	1
Tuberculosis, exploratory laparotomy	1
Sinus thrombosis	1
Erysipelas, septicemia	1
Intestinal obstruction, band	1
Appendicitis	3
Pleurisy, suppurative (6 outside)	20
Broncho-pneumonia as complication of influenza	167
Lobar pneumonia:	
Type I	1
Type II	1
Type IV	2
Hemolytic streptococcus pneumonia	9
Diphtheria	1
Meningitis	3
Measles	3
Tuberculosis	7
Epilepsy	1
Total	432

ACTIVITIES OF THE RED CROSS.

The Red Cross started its work at the United States Naval Hospital, Chelsea, Mass., April, 1918, under the direction of Miss Ruth V. Emerson, a former medical social worker at the Massachusetts General Hospital. Her work and the functions of the organization in relation to the hospital were outlined by the commanding officer in the following order:

1. It shall serve as an adjunct to medical care—
 - (a) By arranging for places of convalescence for limited periods in families in or near Boston.
 - (b) By arranging for further medical care for men about to be invalided from service, and for whom the Government is no longer responsible. This

includes such matters as placing patients in contact with civil resources, and arranging for sanitarium treatment for tubercular patients.

2. It shall assist in hospital administration—

(a) By overseeing visitors from other organizations or individuals who are interested in the welfare of the men.

(b) By keeping relatives or others concerned in touch with patients, both as to health and as to matters pertaining to allotments, war-risk insurance, etc.

3. It shall serve patients' families—

(a) By writing friendly letters to supplement the hospital official telegram or letters which are sent to parents of all seriously sick patients.

(b) By securing boarding places for relatives coming from a distance, and by otherwise showing hospitality to such.

4. It shall serve patients—

(a) By writing letters for patients too ill to write.

(b) By giving advice and information to patients concerning allotment and allowance, payment of which may have been delayed, and about the various provisions of the soldiers' and sailors' civil rights act.

(c) By arranging for a Red Cross home service visitor to call on the patient's family, especially if he is anxious about financial or other troublesome matters.

5. It shall serve home service sections—

(a) By giving all helpful information obtained from the patient or otherwise to the home service visitor who is trying to untangle some complicated family problem.

Up to April, 1918, there was no systematic visiting; as a result of this, many patients had abundant visitors, while others were left unvisited. The Red Cross worker soon organized all the groups of visitors from other organizations as well as individual volunteers, so that each ward had at least one visitor, who had an aptness for dealing with men. Her duty was to know all the men in her ward and to keep in touch with the director both night and morning in order to receive or give reports on patients under her supervision. This frequently entailed taking some lonesome mother for an automobile ride or to dinner.

In May, 1918, two new medical social workers, Miss Katharine Crothers and Miss Florence Harvey, joined the staff. Even in this brief time, many patients came for help in the matter of further treatment after discharge from the service, and most of the correspondence from families or individuals concerning allotments and information in regard to the conditions of patients was turned over to the Red Cross by the hospital authorities. In July, 52 new patients were referred to the Red Cross workers; this made a total of 70 cases on whom some definite action was taken during the month. During this same month three students from the Red Cross Home Service Institute were attached to the hospital for their field work. In the meantime, work was started on the Red Cross recreation building.

By August the work had so increased that instead of simply using one desk in the medical officers' room, it was found necessary to move

into a separate compartment where there was room enough for five or six desks and numerous filing cabinets. This change came none too soon, for by the end of this month the influenza epidemic had already gained headway and every facility of the hospital and every associated organization was taxed to the limit.

It was during this frightful outbreak that the Red Cross proved itself a friend to the patients, the families of patients, to the doctors, and to the hospital administration. From the beginning innumerable letters, telephone calls, and telegrams from and to anxious parents and friends required most thoughtful consideration. It was early found that the only way to obtain accurate data was by daily rounds and note taking in association with the doctors on wards where patients were seriously ill, so that Miss Emerson, and later Miss Crothers and Miss Harvey, spent all the morning taking daily bedside notes on every patient with the serious pneumonia complication of influenza. Frequently they made second rounds in the afternoon to keep better posted as to the patients' conditions. Then between times and late into the night these workers sent letters and telegrams and telephoned and completed the other details of their work. These workers also checked up all official telegrams sent to parents or friends on patients seriously ill. At one time there were found pneumonia wards with 30 patients to a ward, so that the whole Red Cross staff was doing duty throughout the morning in constant contact with patients concerning whom they were to give accurate information to anxious families.

Frequently relatives were unable to reach the patient before he died. It then devolved upon the workers to give as much detail as possible concerning the man's death, including any last messages. In such cases a letter was also written to the home service section requesting a visit to the family and advice in the matter of war-risk insurance.

In addition to the collection and distribution of accurate information concerning patients, it also devolved upon the Red Cross workers to make arrangements in Chelsea and Boston for housing and feeding visiting relatives, who soon began to come from all parts of the country; some with enough funds, many with scarcely enough to get them to the bedside of a dying son or husband.

During the greatest stress, covering a period of about four weeks, many medical social workers from civilian hospitals volunteered their services in the evenings to relieve the regular staff. In this way, it was possible to have the Red Cross office open until 10 p. m. every day. Then it was that arrangements were made for serving tea and sandwiches every afternoon to visiting friends and relatives. When one considers that men were dying at the rate of 10 and 15 a day for a period of a month, one can better measure the amount of work

entailed and the tremendous amount of nervous energy required to do the work well. Never during the whole epidemic was the Red Cross found wanting in carrying out every detail of the work to which it was assigned. It gave overflowing measure through willing hearts and hands. Special credit is due Miss Emerson, who began the work, and to Miss Crothers and later Miss Horn, who continue the work with untiring enthusiasm and devotion.

During September alone, 551 letters and 26 telegrams were sent by the Red Cross to parents and friends of seriously ill patients.

Early in October the epidemic had decreased sufficiently to allow the more normal type of work to be resumed. During this month over 100 overseas Marines were admitted to the hospital; many without staff returns; many without funds for sick leave which had been granted. All were interviewed, their service records examined, and loans made whenever desired.

The Federal Board for Vocational Education at this time sent a representative to take charge of physically disabled patients about to be discharged. With this representative the Red Cross immediately cooperated, giving representative data concerning patients and receiving in return educational and vocational data.

About the same time occupational therapy, which had been started during the early summer in a small way by Miss Minnie Brackett was again taken up on a much larger scale. The work was at first chiefly along the line of toy making and basketry, but soon developed into other fields, such as the making of fancy belts, hand bags, rugs etc. This work has been further expanded to fit the capacity of the men.

RED CROSS RECREATION BUILDING.

Work on the Red Cross recreation building was begun in June, 1918. As soon as the house was completed and properly equipped, it was turned over to the Navy. Nightly entertainments have been held in the house. Always a cinematograph show and two or three times a week a vaudeville performance was provided by the Knights of Columbus, Jewish Welfare Society, Young Men's Christian Association, War Camp Communities, or some other organization of like character, which volunteers its services to the Red Cross. Twice each week, in the afternoon, there is an entertainment in each ward having bed patients, and at Christmas time the wards are decorated, carols are sung, and presents distributed. Members of theatrical companies have volunteered their services for an hour or two once a week. Arrangements have been made for a woman to play the piano twice a week to entertain the men. Indoor games were supplied by the Red Cross, and the patients spend much of their time playing games, reading, and writing. The recreation building has

served as a pleasant place for convalescent patients to receive their relatives and friends on visiting days.

The recreation building has been of great service in many ways. It has not only provided means for occupying the minds of convalescent patients, but has been of great service in keeping the hospital wards quiet, as convalescent patients spend most of their time in the recreation building.

STATISTICS OF RED CROSS DEPARTMENT.

[U. S. Naval Hospital, Chelsea, from April 22, 1918, to August 31, 1919.]

Month.	New cases cared for.	Letters to parents or friends.	Telegrams to parents or friends.
April.....	3	No statistics.....	No statistics.
May.....	40	do.....	Do.
June.....	16	do.....	Do.
July.....	35	do.....	Do.
August.....	68	do.....	Do.
September ¹	305	551.....	261.
October ¹	174	No statistics.....	No statistics.
November ¹	132	do.....	Do.
December ¹	109	134.....	22.
January ¹	153	245.....	15.
February ¹	159	123 letters to families of patients, 61 to home service sections, 14 miscellaneous.	37.
March.....	152	135 to families of patients, 103 to home service sections, 50 miscellaneous.	35.
April.....	123	169 to families of patients, 106 to home service sections, 59 miscellaneous.	24.
May.....	196	159 to families of patients, 62 to home service sections, 106 miscellaneous.	37.
June.....	151	204 to families of patients, 102 to home service sections, 55 miscellaneous.	35.
July.....	106	96 to families of patients, 136 to home service sections, 71 miscellaneous.	34.
August.....	87	200 to families of patients, 130 to home service sections, 37 miscellaneous.	7.

¹ Period of epidemic of influenza.

In addition to the new cases referred to above the department handles each month, usually, between 125 and 200 active cases carried forward from previous months.

The above history shows the rapid expansion of a base hospital from a single hospital building of 150 beds to a group of hospital buildings of 1,142 beds, with all the increase in equipment, medical personnel, nursing corps, Hospital Corps, civilian employees, commissary department, etc. It shows how rapidly such a hospital can expand to meet an emergency and with what facility it can handle the increased number of patients, not only within its own confines but also among a large group of civilian hospitals.

It would be a bit unfair not to mention the courtesy and the ready adaptability of the medical departments of the various civilian hospitals in their cooperation with the military organization. At no time did these men fail to give the best possible service.

A PLAN TO INCREASE THE EFFICIENCY OF HOSPITAL CORPS INSTRUCTION.

By W. M. KERR, Lieutenant Commander, Medical Corps, United States Navy.

Those of us who have been especially interested in the welfare and improvement of the Hospital Corps during the past 15 years have noted with satisfaction many changes brought about by the Bureau of Medicine and Surgery, which have directly benefited the hospital corpsmen and increased their efficiency. Among these changes may be mentioned, first, the establishment of the Navy Nurse Corps which brought to the naval hospitals the refining influence of women trained in the art of nursing who have by tact and patience improved the conditions in the wards, and who have by example and by teaching imparted to the hospital corpsmen who have served with them some of the principles of nursing—an art which is almost instinct in women but which men must develop by study and practice; second, the establishment of the Hospital Corps schools, the pharmacist's mates school where men are prepared for independent duty, and the elementary schools where the recruit is given a right start and taught the first principles of a hospital corpsman's duty and the rudiments of that special knowledge which a hospital corpsman must acquire in order to become proficient; third, an increase in the Hospital Corps ratings and an increase in the number of pharmacists allowed so that the hospital corpsman to-day is assured of steady promotion provided he demonstrates his ability; fourth, the establishment of the correspondence course for pharmacists; and fifth, the issue of the Hospital Corps quarterly, a periodical especially for the hospital corpsman, in which items of interest may be presented to him and to which he is invited to contribute articles which may prove interesting and instructive to other members of the Hospital Corps.

The war brought a great increase in the number of hospital corpsmen in the Navy. The corps grew like a mushroom over night. The established Hospital Corps schools were swamped, the courses had to be shortened, the instruction became intensified in order that as many men as possible might be trained in a short time. Schools came into existence all over the country, at hospitals, at training camps, at receiving ships. I have in mind as I write one little school which was established at the hospital of the training camp at San Diego in order to have men who had been able to receive only

six weeks instruction in a Hospital Corps school better fitted to undertake the various duties which awaited them beyond seas. Just what definite benefit these men received from the instruction in this San Diego school no one can tell, but I believe the vast majority were more capable of taking up new duties and inspired to better endeavor after receiving the instruction which our doctors gave them. These men were exceptional men; many were college graduates. They were all eager to learn the details of this new work into which the war had plunged them. To them, as well as to the commanding and to the executive officer, this school was an important part of their work, a thing not to be considered trivial. But even with this spirit the school did not run itself. It required constant supervision on the part of the executive surgeon. Many difficulties were encountered in getting the doctors to give the instruction. Some of them when the time for class arrived would be busy with other details and did not wish to be interrupted and a hundred and one little emergencies would arise each offering an excuse to put off the class. And there were difficulties encountered in getting the men to go to class. White had cement walks to lay or a fence to build, Jones had to repair an ambulance tire, Brown was busy in the office helping the pharmacist get out a report, Smith was making media which the bacteriologist needed in the morning. So it was a constant fight on the executive's part to keep these classes going. He realized that the men were not competent to meet the various emergencies they might encounter at sea or in France, and he determined to do his best to see that they left the hospital better equipped mentally than when received. I believe his desires were realized.

This intensive training of volunteers for the war occurred at all places where the Medical Department of the Navy was represented, with the result that the Hospital Corps of the Navy gained for itself in the World War an enviable reputation for efficiency. But now the war is over and we are going back to peace-time activities. The men who so nobly toiled from daybreak till far into the night at sea or ashore, those hospital corpsmen, who came as volunteers during the war, have gone back to their homes. We are getting a new Hospital Corps and we have many things to offer them, but the big thing is education, a chance to advance, to become better men mentally and physically through their service in the Navy.

We may divide our men into two classes—those who are going to remain with us and make the Hospital Corps a career, and those who are going back into civil life at the end of their enlistment. What inducement can we offer the man on the outside who is contemplating taking the place of some discharged hospital corpsman? We have got beyond the "Join the Navy and See the World"

stage. We must enter into competition with the industries of civil life which offer so many opportunities to the capable young man. We must be able to assure the recruit that, if he has it in him, he will get a definite asset out of his naval service; that he will leave the Navy better equipped to face the problems of civil life and to pursue one of the various branches which make up our special work; that he can become a competent pharmacist, a first-aid man, a technician in a clinical or in an X-ray laboratory, an assistant in a genito-urinary clinic, etc.; or that he can lay the foundation for the study of dentistry or medicine. To the man who is going to remain in the Navy we must be able to offer an education and a training which will bring out his latent abilities and which, if he has it in him, will make him a leader of men. We need leaders in the Hospital Corps—men with initiative. They are rare. Many an executive surgeon has longed for a chief petty officer competent to relieve him of the minor details of the work about the hospital, a man who would carry out his policies without being told daily to do this or to do that. Yet these men can be developed. The hidden possibilities of hospital corpsmen can be brought out, developed, and made to be of vast assistance to us by properly directed education.

We have the three Hospital Corps schools for elementary instruction and the pharmacist's mates school for the preparation of men chosen for independent duty. These institutions have done, are doing, and will continue to do excellent work. They have a place of prime importance in our educational scheme, but their value is lessened by lack of system in post-graduate instruction.

The course in our elementary Hospital Corps schools is of six months duration and is designed to give the recruit a good start in his corps career. From these schools the men naturally are distributed among the various hospitals and hospital ships for the purpose of seeing the practical application of and to get more practical instruction in the subjects to which they were introduced at the school. But with the system of instruction now in vogue these men are taught more or less in a haphazard manner, with no definite course of study outlined for them by the various medical officers, pharmacists, and nurses whom it is convenient to assign to this duty in addition to their paramount duties in the hospital organization and, as a result, all through the service there is occurring about what was encountered at San Diego the instructor—too busy with other things or sometimes not temperamentally qualified to teach—giving just because the regulations require such and such instruction to be given, and the executive surgeon, keen to see that the medical journal contains a statement that this instruction has been given, giving reluctantly what is frequently considered by him time wasted

in trying to impart some knowledge to a group of hospital corpsmen who often appear not too anxious to learn. And are they altogether to blame? Can they keep up interest in a course in which the classes are often excused because of some emergency requiring the presence of the instructor, or in which the instructor is annoyed by the teaching detail and hurries along, often cutting the allotted time short so as to get away to his other duties, or in a course which started promisingly, but shortly and unexpectedly terminated on the detachment of the medical officer who was guiding them through its intricacies? Can they be expected to retain interest in a course which is not well planned, which does not proceed smoothly with a definite aim to a successful termination? It is not reasonable to expect interest to be kept up under this system of instruction, nor is it reasonable for us to expect to get the best out of our men in this way.

The solution of the problem of better instruction seems to lie, first, in the standardization of the course of instruction given at the naval hospital, and in the development of a corps of instructors—pharmacists and nurses—to be detailed to the various hospitals for the express purpose of instructing the hospital corpsmen in courses developed and outlined by the Bureau of Medicine and Surgery, and followed in every naval hospital, so that all men in hospitals will receive identical instruction in the subjects which pertain to every phase of our work; second, in the development of a correspondence course for men on independent duty in order that they may not deteriorate while away from the direct observation of medical officers; and, third, in the development of a new textbook for the use of the Hospital Corps to supplement the Hospital Corps Handy Book.

With such a standardized course of post-graduate instruction given by "whole-time" qualified instructors would we not be able to produce better hospital corpsmen, men who would develop into leaders or who would go back into civil life at the expiration of their enlistment with a feeling that they had gotten something worth while out of their service in the Navy and who would tell the boys back home that the Hospital Corps of the Navy had something that was worth going after?

The contemplated scheme of standardized instruction is as follows: A pharmacist and a nurse specially selected by the bureau for teaching ability will be assigned to each hospital for the express purpose of carrying out a course of instruction planned and outlined by the bureau and which will be in effect in all hospitals.¹

The war has given us a number of pharmacists, among whom there are men fully qualified to carry out the details of this plan. It may be a little difficult to get nurses for this work, but they are necessary

¹ This feature of the plan is already being tried in certain naval hospitals.

in imparting instruction in nursing and dietetics. The detailing of such "whole-time" instructors has many advantages. It relieves the medical officers from the drudgery of instruction in the elementary branches, which the vast majority detest and which some are not temperamentally fitted to teach. It gives the hospital a pharmacist qualified to teach, who in addition to his duties as an instructor could be placed in direct charge of the Hospital Corps, their quarters, discipline, liberty, etc. It brings the hospital corpsman into daily contact with one who is personally interested in his welfare, who is anxious to see him advance; it adds that personal touch which means so much to all of us. The medical officers must still be used to instruct classes in the special branches of medical and surgical work, so they will still be in touch with hospital corpsmen and have their place in the instruction scheme. When it comes time for these instructors to take their turn at sea the medical officers of the fleet will have well-trained men who are familiar with the course to assist them in teaching, men who have the instruction of the Hospital Corps at heart and who would not be apt to be remiss in their endeavors to bring out the latent possibilities and to improve the hospital corpsmen working with them.

The subjects which may properly fall to the instructor of hospital corpsmen detailed by the bureau to hospitals are as follows

Nursing, dietetics, and ward management (these subjects to be taught by the Navy Nurse Corps).

Anatomy and physiology.

Botany, materia medica, therapeutics.

Medical zoology, pharmacy.

Physics and chemistry.

Minor surgery, first aid, hygiene and sanitation.

Clerical and commissary work.

Property accountability.

Drills, recreation, athletics.

If this plan is considered feasible, in order to get it going, some medical officers and pharmacists interested in teaching, who have had a variety of duties ashore and afloat and know the needs of the hospital corpsmen, must prepare for the bureau an outline of these subjects. With this outline as a guide each instructor, aided by the medical officers of the hospital, could work up his course and submit his results to the bureau for comparison with courses submitted by the instructors at other hospitals. A board could then prepare a definite course of study for all.

This course, which would be described in detail in an official communication to all medical officers, would be of great assistance to them. It would give the young medical officer serving alone a guide for the instruction of his men. It would give him an idea of the

standard which the bureau has set for the hospital corpsmen, and it would be of great assistance to examining boards in formulating examination questions for men due for promotion.

The instruction in special subjects given to the higher ratings by the officer in charge of each specialized branch of the hospital work must follow some well-outlined plan adapted to all hospitals and should have as its aim the qualification of men to act as X-ray assistant, laboratory assistant, surgical assistant, anesthetist, dispensing assistant, property clerk, commissary assistant, master-at-arms, etc.

In addition to supervising the instruction and other activities of the Hospital Corps, it is contemplated in this scheme that the instructor direct the athletics of the hospital corpsmen. Too little attention is paid to their play time. Most hospitals have baseball teams and football teams, but these benefit a chosen few. The instructor could devote a half hour or more daily to this essential, and the contemplated course provides that all hospital corpsmen receive instruction and exercise in the following sports: Tennis, calisthenics, medicine ball, basket ball, boxing, running, jumping, hand and volley ball.

Executive surgeons have sometimes experienced difficulty in arranging reliefs for men going to class. Sometimes when the number of hospital corpsmen has been large this problem has been solved by dividing the students into watches, which resulted in two instruction periods in which the teacher imparted the same instruction to each watch. In the contemplated scheme the hospital corpsmen are divided into four classes according to rates, so that no relief is necessary.

Class A.—Chief pharmacist's mates.

Class B.—Pharmacist's mates, first class.

Class C.—Pharmacist's mates, second and third class.

Class D.—Hospital apprentices, first and second class.

We often find men in the higher ratings who feel that they do not need to attend the classes as they are now held because they have been examined in the subjects dealt with in class and have demonstrated to some board that they have sufficient knowledge of the subject to have been promoted. This, of course, is fundamentally wrong, and a standardized course corrects this defect by opening a way for these men, after a short review of the subjects in which they have qualified, to take up advanced work. Very often the courses given have never extended beyond the elementary subjects, and it is human nature, perhaps, for these men to reason as they do. And we find men in the higher ratings who have been promoted because they are "good men" or have done excellent work in some particular detail

but who have not the general knowledge required for the grade in which they are serving. On transfer to a new station these men often find themselves handicapped and sometimes have to be disgraced just because their preparation for promotion was not properly supervised. These men as a rule become disheartened and leave the service dissatisfied. The proposed standardized course will minimize this defect.

The schedule of instruction is as follows:

	Monday.	Tuesday.	Wednesday.	Thursday.
Class A.....	1. 00-1. 30	1. 00-1. 30	1. 00-1. 30	1. 00-1. 30
Class B.....	1. 30-2. 30	1. 30-2. 30	1. 30-2. 30	1. 30-2. 30
Class C.....	2. 30-3. 30	2. 30-3. 30	2. 30-3. 30	2. 30-3. 30
Class D.....	3. 30-4. 30	3. 30-4. 30	3. 30-4. 30	3. 30-4. 30

Recreation (athletics).

	Monday.	Wednesday.
Chief pharmacist's mate.....	4. 30-5. 00	4. 30-5. 00
Pharmacist's mate, first class.....		
Pharmacist's mate, second class.....		
	Tuesday.	Thursday.
Pharmacist's mate, third class.....	4. 30-5. 00	4. 30-5. 00
Hospital apprentice, first class.....		
Hospital apprentice, second class.....		

Class "A" subjects.—Pharmacy, chemistry, clerical and commissary work, administration and instruction in the specialties.

Class "B" subjects.—Physics, elementary botany, medical zoology, pharmacy (dispensing and dispensary management), physics and chemistry, materia medica and therapeutics, clerical and commissary work, property accountability, hygiene and sanitation, instruction in the specialties, and ward management.

Class "C" subjects.—Anatomy and physiology, minor surgery, first aid, nursing, dietetics, operating-room technique, laboratory technique, ward routine, and simple clerical work.

Class "D" subjects.—A short review of the Hospital Corps school course, practical nursing, diets, ward routine, operating-room routine, minor surgery, first aid, the hospital regulations, and Hospital Corps drill.

This course, which supplements and augments that given in the Hospital Corps schools, assures the young hospital corpsman about a year's supervised instruction before he goes to sea, and it affords the higher ratings a definite source of aid in seeking advancement in the corps. As each subject is completed and the man has demonstrated that he is thoroughly familiar with it in all its phases, a certificate should be issued to him stating that he has completed

the subject, and this certificate should become a part of his service record.

There are medical officers in the fleet who have given this subject serious consideration. They have come to realize from results attained on board ship and from examinations of hospital corpsmen preliminary to promotion that there is something wrong with our system of instruction. The Hospital Corps schools can only start the recruit in the way he should go; the instructor in the hospital can lead him on through a period when he may be expected to have found himself and can send him off to sea well equipped to continue his studies, and to win for himself a reputation for efficiency.

This standardized course opens a new line of work for the naval pharmacist, one in which he will be able to increase the efficiency of the corps of which he has the honor of being a member. The work will not be easy and many disappointments will be encountered, but those who take up this work will have the satisfaction of knowing in the end that they have labored to benefit their fellow men.

The idea of a standardized course of instruction for hospital corpsmen in naval hospitals is not original with the writer. Many men have thought on this subject and their ideas have been brought together in this form. They see the need of better instruction for the hospital corpsmen and believe that if this plan could be put into effect lasting benefit to the service would result.

A STUDY OF TWO CASES OF DIABETES MELLITUS SEEN AT THE U. S. NAVAL HOSPITAL, NEW YORK.

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The purpose in reporting these two cases of diabetes mellitus is twofold. In the first place, each case presented rather unusual features, one case being in a boy of 17 years, who at the time of admission lacked the usual features of a diabetic history, and who was rendered sugar-free with great difficulty, and kept so only by most rigorous dietetic measures; the other case being in a young man of 19 years, who, soon after admission, on an ordinary soft diet had a sugar output of over 500 grams per 24 hours, with a percentage of sugar in the urine varying between 7.9 and 16.1. In the second place, the results obtained in these two cases afford a striking comparison of two methods of treating this disease, namely; first the original Allen fasting treatment, consisting of preliminary fasting, and alternate fasting and feeding to render the patient sugar-free; second, the method advocated by Joslin, of using a preliminary fat-free diet, followed by a rapid reduction of protein and finally of carbohydrate, only proceeding to fasting if nec-

essary to render the patient sugar-free. In addition an illustration is afforded of the control of acidosis by diet rather than by the administration of alkalies.

The urine was collected in large bottles in 24-hour quantities, the period ending at 7 a. m., when the whole amount was at once taken to the laboratory, so that a qualitative test could be done before 9 a. m., and reported before the completion of sick call. With this report, and usually by 10 a. m., a report of the amount of sugar if any were present, and of the presence or absence of acid bodies in the urine, the medical officer could prescribe intelligently the diet for the remaining two meals of that day and breakfast of the next day. The figures for the diets in the accompanying tables however, represent values for the three meals of the date indicated. The writer is indebted almost entirely to Joslin's "Treatment of Diabetes Mellitus" for the diet values and practical methods of treatment used.

CASE 1. C. G. D. Age 17. Rate, apprentice seaman. Had been in service only 47 days when admitted, September 23, 1919, from the U. S. S. *Rochester*; an ambulant case. Chief complaint was pain in the back when doing any heavy lifting; duration two to three weeks. Present history: No other complaints. Had gained in weight and felt strong. No polyuria, polydipsia, or polyphagia. Pain in the back had bothered him off and on for the previous four or five months. He had been told before enlisting that he had diabetes. Past history: Negative for any serious illness. His mother runs a confectionery store, and the patient had been in the habit for some time of gorging himself on candy and ice cream. Family history: Negative for diabetes. Father died of pulmonary tuberculosis. All his father's brothers and sisters are said to have "weak kidneys" (nocturia, gravel, etc.). Physical examination of the patient, who was up and about, was negative, except for the following points: Eyes were slightly puffy at times about the lids; nasal septum was deviated to the right, with an associated rhinitis. Heart: Second pulmonic sound accentuated, and second sound reduplicated at the apex; otherwise negative. Moderate degree of hypospadias present. The urine, curiously enough, was reported negative for sugar by the laboratory on the first two examinations the specific gravity, however, being 1.032 to 1.036, with a trace of albumen each time. This finding threw the diagnosis of diabetes into doubt, especially in view of the patient's good general condition and few complaints. However, the third examination, on the fifth day after admission, showed 7.15 per cent sugar; sp. g. 1.030; a trace of albumen; no acetone; no diacetic acid. The first accurate estimation of the 24-hour output of sugar, on October 2, showed 126 grams

Treatment and clinical course. (See Table 1.)—During the first week, because of the negative urine reports, he was placed on a regular diet. On September 30, the old-fashioned "diabetic diet," consisting of meat, fish, eggs, green vegetables, salads, olive oil, etc., was instituted. He was kept on this diet until October 16. During this time the sugar output varied between 36 and 126 grams per day, the average output of the first three days being 118 grams and of the last three days 75 grams. It became evident that this method of treatment was inadequate. Accordingly, on October 17 the Allen fasting treatment was begun, starting off with a rigid fast, the patient being only allowed water ad libitum and whisky one-half ounce t. i. d. Whisky was poorly tolerated, and was discontinued on the second day. On the third day of his fast the patient began to receive 8 ounces of clear meat broth and one cup of black coffee, without sugar, t. i. d. A marked effect of this reduction in diet was at once evident, the sugar output falling from 92 grams to 28 grams. A mild acidosis developed, however, and on October 21, although acetone was not reported in the urine, the odor of acetone was so strong on the breath that a soda cracker was given in order to furnish a little carbohydrate to burn. On October 24, the patient ate about 1½ cubic inches of cheese against orders, causing a rise in sugar excretion from 10 to 37 grams. The next day both acetone and diacetic acid were present in the urine. As the patient had now fasted for eight days continuously, he was given for a period of four days a diet of carbohydrate 10 grams, protein 22 to 38 grams, yielding 128 to 282 calories

TABLE I.—C. G. D.

Date.	Weight.	Urine.			Blood sugar.	Diet values.				Remarks.
		Volume.	Acetone.	Diacetic acid.		Carbohydrates.	Protein.	Fat.	Calories.	
	Pounds.	Grams.	Grams.	Grams.	Grams.	Per cent.	Grams.	Grams.	Grams.	
Sept. 23					0 (?)	do.	Unknown (regular diet)			Sp. g. 1.036; trace of albumen.
24					0 (?)	do.	do.			Sp. g. 1.032; trace of albumen.
25						do.	do.			
26						do.	do.			
27						do.	do.			
28			0	0	105 est.	do.	do.			Sugar, 7.15 per cent.
29						do.	do.			
30			0	0	Large amt.	Unknown (diabetic diet, meat, fish, eggs, oils, salads, etc.)	do.			
Oct. 1					Large amt.	do.	do.			
2		2,010	0	0	126	0.088	do.			Sugar, 6.26 per cent.
3		2,150			113	do.	do.			Sugar, 5.25 per cent.
4						do.	do.			
5		1,700			116	do.	do.			Sugar, 6.82 per cent.
6		2,050			Large amt.	do.	do.			
7		2,350			107	do.	do.			Sugar, 4.5 per cent.
8		950			36	do.	do.			Sugar, 3.79 per cent.
9		1,800			72	do.	do.			Sugar, 4 per cent.
10		1,300			52	do.	do.			Do.
11		2,000			100	105	do.			Sugar, 5 per cent.
12		2,350			98	do.	do.			Sugar, 4.17 per cent.
13						do.	do.			Sugar.
14		1,590			66	do.	do.			Sugar, 4.15 per cent.
15		1,610			67	do.	do.			Sugar, 4.14 per cent.
16		2,200			92	do.	do.			Sugar, 4.18 per cent.
17						do.	do.			Whisky, 45 cc.; fasting.
18		1,250			28	do.	do.		157	Whisky, 30 cc.
19		900	Pres.	0	17	do.	do.	16	105	No whisky.
20		850			11	do.	do.	16	64	Fasting.

21	1,350	Tr.	42	5	16.7	0.5	89
22	1,300	Tr.	20	Tr.	16	Tr.	64
23	2,100	Tr.	10	Tr.	16	Tr.	64
24	2,200	Tr.	37	Tr.	22	7.9	159
25	2,075	Pres.	27	10	22	Tr.	128
26	750	Tr.	14	10	22	Tr.	128
27	550	Tr.	12	10	38	10	282
28	550	Tr.	17	10	38	10	282
29	1,120	Tr.	11	Tr.	16	Tr.	64
30	900	Tr.	9	Tr.	16	Tr.	64
31	1,550	Tr.	8	Tr.	16	Tr.	64
1	3,100	Tr.	9	Tr.	16	Tr.	64
2	2,000	Tr.	7	Tr.	16	Tr.	64
3	1,300	0	9	10	38	10	282
4	1,650	Tr.	6	10	38	10	282
5	1,450	Pres.	13	10	38	10	282
6	750	Pres.	9	Tr.	16	Tr.	64
7	500	Tr.	5	Tr.	16	Tr.	64
8	1,600	Tr.	8	Tr.	16	Tr.	64
9	2,200	Pres.	6	Tr.	16	Tr.	64
10	2,500	Pres.	5	Tr.	16	Tr.	64
11	2,000	Pres.	6	Tr.	24	10	186
12	2,000	Pres.	9	10	38	10	282
13	2,000	Pres.	8	10	38	10	282
14	1,700	Pres.	10	10	38	10	282
15	3,000	Pres.	12	10	38	10	282
16	3,600	Pres.	19	10	16	Tr.	104
17	2,300	Pres.	10	Tr.	16	Tr.	64
18	2,600	Pres.	0	Tr.	16	Tr.	64
19	2,700	Pres.	0	Tr.	16	Tr.	77
20	2,300	Pres.	0	3.3	16	Tr.	114
21	2,700	Pres.	16	6.6	22	Tr.	154
22	3,500	Pres.	0	6.6	24	5	167
23	2,250	Pres.	0	8.3	32	10	251
24	2,000	Ft. tr.	0	10	32	10	258
25	2,700	Ft. tr.	Under 5	10	32	10	258

1 Alcohol.

1 Alcohol.

Under 5

Nov.

TABLE 1.—C. G. D.—Continued.

Date.	Weight.	Urine.				Blood sugar.	Diet values.				Remarks.
		Volume.	Acetone.	Diabetic acid.	Sugar.		Carbohy- drates.	Protein.	Fat.	Calories.	
	Pounds.	Grams.	Grams. V. f. tr.	Grams.	Grams.	Per cent.	Grams.	Grams.	Grams.	Grams.	
Nov. 26	3,400	.....	0	0	.....	1.6	22	6	148	Fasting.
27	3,700	Tr.	0	0	.....	8	32	10	250	
28	3,400	Tr.	0	Tr.	.....	12	28	0	160	
29	3,950	Ft. tr.	0	Ft. tr.	.....	5	30	11	239	
30	3,800	Tr.	0	0	.....	6	43	15	331	
Dec. 1	3,900	Tr.	0	0	.....	6.6	55.3	27	491	
2	2,700	Pres.	0	6	.....	+3	23.5	6	+160	Fasting, but took sugar in broth by mistake.
3	4,000	Tr.	0	0	.....	7	49.5	21	415	
4	4,000	Tr.	0	0	.....	6	46	43.5	600	
5	105	3,400	Tr.	0	0	.....	6.5	48.5	67.5	828	
6	4,000	0	0	0	.....	6.5	49.5	97.5	1,102	
7	4,000	Tr.	0	0	.....	6.5	54.8	97.5	1,123	
8	98	3,700	Pres.	0	0	.....	3.2	17.7	13.5	205	Fasting.
9	3,800	Tr.	0	0	.....	6.2	49.5	68	835	
10	1,700	Pres.	0	0	.....	7.5	58.3	75	938	
11	2,800	Pres.	0	9	.....	7.5	69.3	108.5	1,284	
12	2,900	Pres.	0	0	.....	6.2	31.8	19.5	327	Do.
13	0	0	0	.....	7	43.8	33.5	505	
14	3,000	0	0	0	.....	7	49.8	39.5	583	
15	2,600	0	0	0	.....	7	58.5	53	739	
16	3,750	Pres.	0	12	.....	7	55.5	75.5	930	
17	1,650	0	0	0	.....	6	26.3	6	183	Do.
18	4,000	0	0	0	.....	6	39	18.5	347	
19	2,500	0	0	0	.....	6	50.3	37	558	
20	4,000	Pres.	0	0	.....	6	55.3	52	713	
21	4,000	Tr.	0	0	.....	6	55	73	901	
22	95	2,400	Tr.	0	12	.....	6	55	91	1,068	

Thus alternate fasting and feeding was employed, the fasting periods being gradually shortened, and the feeding periods lengthened. In all, four fasting periods with three intervals of feeding were necessary to render this patient sugar free. The process took 34 days, lasting from October 17 till November 19, on which day he became sugar free, but both acetone and diacetic acid showing in the urine. On the second sugar-free day 100 grams of 5 per cent vegetables was given, and on the following day 200 grams of 5 per cent vegetables, with 30 grams of fish. In the urine 16 grams of sugar appeared, but this was ignored, and 100 grams of vegetables with 30 grams of meat given on the next day, when no sugar was found. The carbohydrate and protein were then gradually increased, keeping the fat intake at a low point at first in order better to determine the tolerance for carbohydrate and protein. By reference to Table 1 it will be seen that at first, as soon as the carbohydrate intake reached about 10 grams and the protein 28 to 30 grams, sugar appeared. As the intake was at such a low level, however, the tolerance was apparently increasing during this time, for, if we disregard December 2, when sugar was taken in the broth by mistake for salt, we find that the next time sugar appeared, on December 11, the intake had reached a much higher level, viz, carbohydrates 7.5 grams, protein 69.3 grams, and fat 108.5 grams, yielding 1,284 calories. The next time sugar appeared, on December 16, the caloric level was 930. There was apparently a lag in the appearance of sugar, for on December 25 a much more rapid increase in diet was begun, reaching figures nearly three times as great for protein and half again as great for fat as had been sufficient before to provoke the elimination of sugar in the urine, yet sugar did not come out until two days later. Moreover, it persisted this time for six days. When the more gradual process of increasing the diet was then resumed, sugar appeared when about the former caloric level, namely, 1,200 calories, was reached. By this time the patient had been surveyed for discharge from the service, and was becoming impatient to go home. He was accordingly discharged on January 13 with a diet of carbohydrates 5 grams, protein 73.8 grams, and 756 calories.

Subsequent course.—When last heard from, on March 6, 1920, nearly two months after his discharge, he wrote that he had been under the care of a specialist at home, and had been sugar free for five weeks, with the exception of one day, and was then eating a diet of carbohydrates 9 grams, protein 115.5 grams, fat 142.5 grams, with the luxury of one baked potato every third day, in addition. His weight was 96 pounds, a gain of 4 pounds since discharge.

Comment on Case I.—Several features of interest were present in this case:

1. **Etiology:** The history of excessive indulgence in ice cream and candy was taken to indicate that the tolerance had been broken down by overtaxation of the assimilative functions. The presence of hypospadias suggested the bare possibility that there might also be some congenital defect of the endocrine system, reflected in the imperfect development of the genitalia and the early appearance of glycosuria.

2. The inefficacy of the old-fashioned "diabetic diet" was illustrated.

3. The difficulty of rendering this patient sugar-free by the ordinary method of straight starvation, even to the point of endangering the patient from inanition. The patient became very weak and uncomfortable during this process, and complained of headache. He cooperated very well, however, as he had been thoroughly impressed in advance with the danger of this insidious disease if it were allowed to continue unchecked.

4. The acidosis produced by the starvation method. Neither acetone nor diacetic acid were present in the urine on September 28, soon after admission, when the estimated sugar output was 105 grams.

5. The loss of weight (see Table 1).

6. The low blood sugar, the three observations ranging between 0.088 per cent and 0.105 per cent (normal figures). These figures may not be reliable, however, as a microchemical method using only 0.2 c. c. of blood and a rough colorimetric comparison was used.

7. The low carbohydrate tolerance—under 10 grams—and the low caloric tolerance—about 1,200 calories.

8. The constant percentage of sugar output reached toward the end of the period on the old-fashioned "diabetic diet," the last four observations during this period being 4.7, 4.15, 4.14, and 4.18 per cent. This suggested the possibility of renal diabetes in this case. Were the blood sugar figures to be considered thoroughly reliable, this hypothesis would be strengthened. Joslin defines renal glycosuria as "glycosuria with normal glycemia, relatively independent of diet." However, in this case, the constant percentage of sugar output may have been due to a fairly constant diet taken over a period of 17 days.

9. The ultimate prognosis in this case is probably very bad in view of, first, the patient's youth; second, the extremely low carbohydrate tolerance and low caloric tolerance; third, the loss of weight. At time of discharge the patient appeared quite cachectic, and had developed a dull brownish pigmentation of the skin. Joslin, on page 38 of his book, shows that on December 1, 1916, of 55 fatal cases of diabetes seen between 1893 and 1916, with onset in the

second decade of life, the average duration of life was 2.75 years, and of 40 living cases of diabetes seen during that time, the average duration of life had been 2.92 years, whereas with onset in the sixth decade, the average duration was 6.92 and 6.29 years, respectively.

10. The lack of necessity for the use of alkalies to combat acidosis. Practically the only time that this patient showed a positive ferric chloride reaction was during the period of intermittent fasting, which had been begun without any preliminary fat-free diet.

11. The D:N ratio was determined only once, on November 11, the fourth day of a period of complete fasting (except for 720 c. c. of broth daily). The figure determined on that day was 5.6, much in excess of the theoretical 3.65 for "complete diabetes." As explained by Joslin, such high ratios are undoubtedly due to irregularity in the excretion of dextrose and nitrogen. Murlin and the writer in 1916 obtained figures ranging from 3.1 to 4.2 (Jour. Biol. Chem., 1916, XXVIII, p. 301).

CASE II. J. R. V. Age 19. Rate gunner's mate, third class. Had been in service 2 years and 7 months when admitted on November 25, 1919, from subchaser 37, which had just returned with the mine-sweeping fleet from the North Sea. Complaints were generalized weakness, cramps in the legs in the morning, polyuria, thirst, loss of 25 pounds in weight, headache and drowsiness, with some lumbar pain. These symptoms had existed about five weeks. Present history otherwise negative. Past history negative. Venereal infection was denied. Family history negative for any chronic disease. Physical examination showed a slightly emaciated young man, lying comfortably in bed, without dyspnea. There was no odor of acetone on the breath. Heart negative. Lungs: Occasional clicking râles at end of inspiration over right interscapular region. Abdomen: Negative except slight tenderness to pressure over each parumbilical region. Back negative. Reflexes: Knee jerks notably diminished.

The urine on the day of admission contained 5 per cent sugar. On the following day, on an ordinary soft diet, the sugar output for 18½ hours was 300 grams, with a trace of acetone, but no diacetic acid. The following two days showed a sugar output of over 500 grams, representing a percentage of from 13 to 16 per cent. These figures are believed to be authentic.

Clinical course (See Table 2).—On the fourth day the patient was given the routine "fat-free" diet, but upon investigation it was found that this diet actually contained about 97 grams of fat per day. Accordingly a rigid weighed diet was prescribed so as to be practically completely fat-free, consisting of broth, 5 per cent vegetables, grapefruit, orange, potato, and bread. The protein was

rapidly cut down from 68 to 23 grams, and the carbohydrate cut down, last of all, to 14 grams. The sugar output showed a truly amazing response, falling in a straight line (see chart), with practically no discomfort to the patient, and without the appearance of even a trace of diacetic acid. The urine became sugar-free on December 6, when the patient was taking a diet of carbohydrates 27 grams, protein 24.5 grams, with no fat, as represented by the following articles of food: Broth 720 cc., 5 per cent vegetables 510 grams, and one orange. After the patient had been sugar-free for two days a gradual increase of carbohydrate and protein, followed later by an increase in fat, was begun. Sugar did not reappear until December 11, when the patient was getting broth 240 cc., 5 per cent vegetables 450 grams, meat 150 grams, potato 150 grams, and bread 30 grams. A reduction in diet made by eliminating all fat, halving the protein, and reducing the carbohydrate to one-fourth caused a marked reduction in the sugar output. Then the patient unfortunately overcame this good result by eating on the following day a meat sandwich with a piece of cheese, after being taunted by fellow-patients because he had to have his food weighed out. This excess brought the sugar output to 50 grams. However, the next day was made sugar-free by a radical reduction in diet, yet without complete starvation, the patient receiving 450 grams of spinach in addition to broth and black coffee t. i. d. He then remained sugar-free practically seven days, until December 21, when he was getting broth 240 c. c., 5 per cent vegetables 450 grams, meat 90 grams, two soft-boiled eggs, bacon 30 grams, potato 120 grams, and bread 30 grams. Apparently the tolerance for both carbohydrate and protein at this time was about 50 grams, with a caloric tolerance of 600 to 700. The carbohydrate was then held at a level of 42 grams during practically the remainder of his treatment, and an attempt was made to increase the protein and fat. On January 7, after he had been sugar-free continuously (except one day), for 14 days, sugar appeared with a diet as follows: 5 per cent vegetables 360 grams, meat 180 grams, six eggs (soft boiled), bacon 120 grams, potato 150 grams, and butter 15 grams, yielding 1,875 calories. The patient said that his appetite was completely satisfied. His weight was 1 pound more than on December 5 (12 days after admission). It now appeared that whenever the caloric intake reached about 1,800, sugar was excreted in the urine. As the patient's appetite was satisfied, and he was holding his own in weight, he was discharged on January 27, 1920, with a diet as follows: 5 per cent vegetables 360 grams, meat 150 grams, six eggs, potato 150 grams, bacon 120 grams, yielding carbohydrate 42 grams, protein 107 grams, fat 121 grams, and calories 1,685.

[illegible]

Estimated.

Subsequent course.—When last heard from, on M stated that although he had had a trace of sugar on a day after first reaching his home, he had now been su weeks. He stated that he had adhered very closely to given him at the time of his discharge. He had gain in weight, and several physicians in his home town w him had expressed the opinion that some one had mad in accusing him of being a diabetic.

Comment on Case II.—1. Etiology: No hereditary fa in this case. There was no history of overindulgence in possibility to be considered is the arduous nature of the he had performed; i. e., on a submarine chaser in the mi fleet.

2. The rapidity and ease with which this patient was n free by means of Joslin's method of treatment. Sugar t from the urine on the fifth day from the time a defin treatment was begun.

3. The striking absence of acidosis. For the last mo stay in the hospital not even acetone could be found in t

4. There was no loss of weight, as in Case 1.

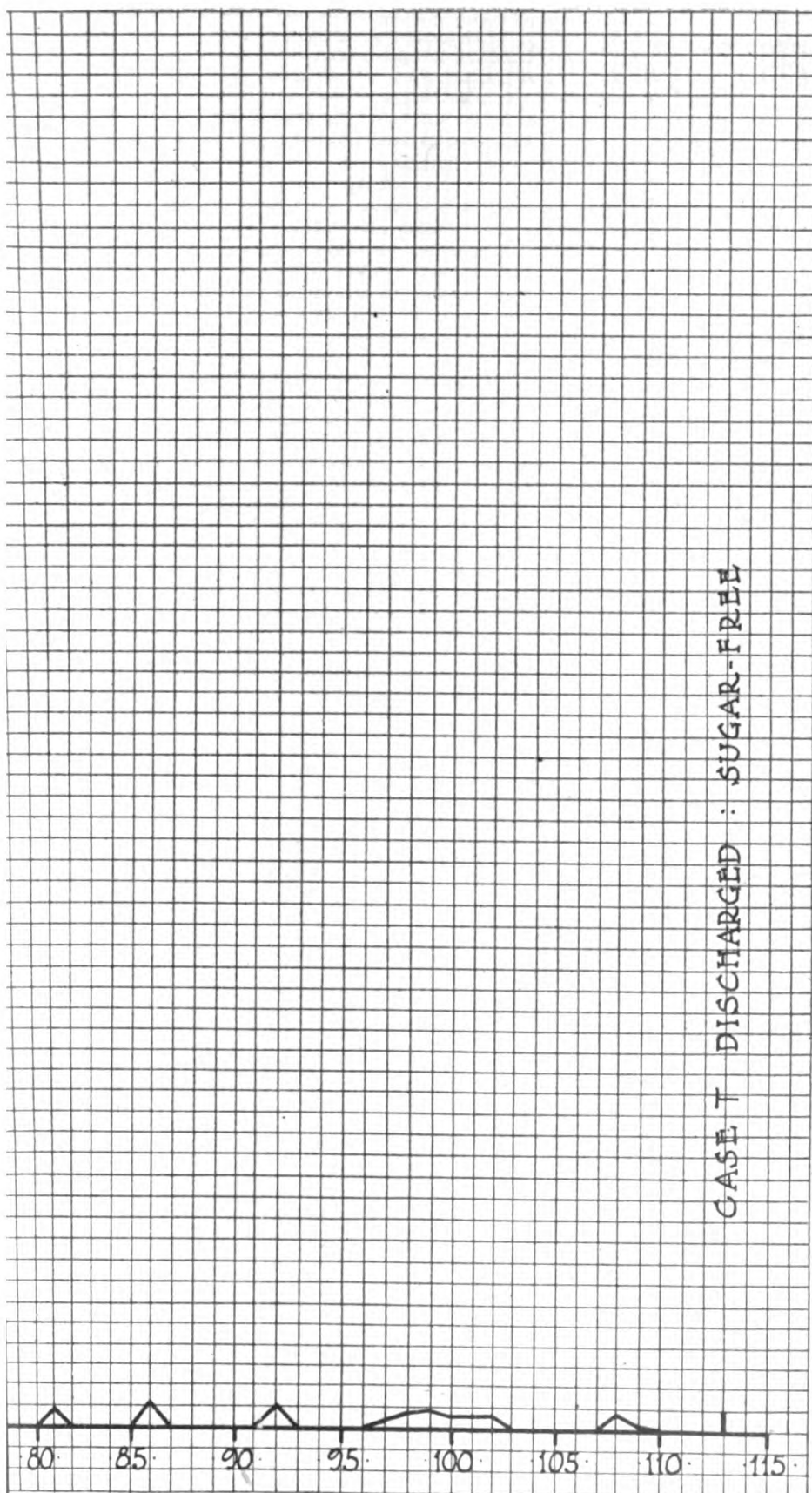
5. The low blood-sugar, 0.16 per cent. (See Table fortunately only one blood examination was made, and time when the urine had been sugar-free for four days, was absolutely no acidosis.

6. The high tolerance and the fact that during the weeks of his stay the patient was able to take a diet w pletely satisfied his appetite, maintained his weight, w maintained practically sugar-free during this time.

7. The prognosis in this case must be considered go whole, provided that the patient continue to exercise cau eating and to keep an eye on his condition, this in se enormous output of sugar when admitted, and in spite of This opinion is based on the ease with which he responded measures and the high tolerance obtained.

Comparison of cases and conclusions.—Two cases of dial tus are presented which show some interesting comparison ods of treatment.

Case I, with a sugar output of 106 to 125 grams per da sugar output only moderately reduced by the old-fashione fat diet and developed marked acidosis, while with the All of straight starvation followed by alternate feeding and days were required to render the patient sugar-free, and produced thereby considerable acidosis, marked weaknes of weight.



Case II, on the other hand, entering with a sugar output of 300 to 500 grams per day, required only five days to become sugar-free, and at no time had to undergo the discomforts of complete fasting; this result being accomplished by Joslin's method of first eliminating all fat, then rapidly diminishing protein, and cutting down carbohydrate last of all. This patient remained sugar-free over a period of five days while still getting 14 to 45 grams of carbohydrate, and sugar returned only when the diet had reached carbohydrate 63 grams, protein 60 grams, and fat 25 grams. At no time did this patient have more than a slight acidosis, as indicated by the presence of acetone, but the complete absence of diacetic acid from the urine. The advantages of Joslin's method in this case were obvious. The patient was not weakened and discouraged by prolonged fasting; on the contrary, he was encouraged and stimulated to cooperate by seeing the pronounced results obtained with comparatively mild restrictions in his diet.

It may be objected that Case II was very mild (in spite of the large sugar output), while Case I must have been an inherently severe case. This is no doubt true, but it is a question in the writer's mind whether, had Case I been treated from the start by the method used in Case II, it might not have proved much less severe than it did.

At no time was it found necessary to administer alkalies in any form to prevent or control acidosis; the primary control of this condition should be dietetic.

Conclusions, to be valid, can not be based on two cases; nevertheless the contrasting results obtained in these cases were so striking that the writer can not help being most favorably impressed with the advantages of Joslin's method of treating human diabetes. It should be said here that the tables in Joslin's excellent book are very simple and clear and make the work of prescribing diets in diabetes a very easy matter.

FLAT FOOT IN THE NAVY.

By C. F. PAINTER, Lieutenant, Medical Corps, United States Naval Reserve Force.

There is no more frequent cause for disability and consequent "lay off" from duty in the naval service, afloat or ashore, than so-called "flat feet." It is unfortunate that such a term has been applied to the train of symptoms which the name connotes. Anatomically there are variations within wide limits for the apparent height of the arch of the foot, and but little attention should be paid to this apparent height, or lack of it, in estimating whether an individual has flat foot or not. The functional and symptomatic tests are the only ones which are applicable. Complicated measurements and the

use of tracings on smoked paper, or observation of the area of sole in contact with a glass plate, viewed through a reflecting mirror, are all equally futile in furnishing information of any value upon which to base a diagnosis of flat foot.

One has only to study feet in the mass to realize that the human foot is an instrument for sustaining weight and assisting in the propulsion of the body which conforms to racial and familial types as closely as do any other physical features which furnish a basis for recognizing family or race, as reflected by those features. There can be no standardization of feet so long as this is true. Merely belonging to a low-arched family does not justify the classification of any one as flat-footed without reference to the behavior of that person's foot under strain.

It is well to review the anatomy of the foot in order to understand the nature of the symptoms and physical signs that occur in, or are referred to, the foot. In the first place the arch of the foot is not an arch at all in the sense in which we commonly employ the term. In the longitudinal arch the posterior segment is short, whereas the anterior is much longer; there is nothing in the bony structure corresponding to the keystone of an arch. If there were no ligaments or fasciæ to hold the bones together there would be nothing about the relation or conformation of the tarsus tending to keep them together as an arch. When the interarticular and capsular ligaments are added an element of stability has been introduced, but it is not an element that can withstand strain from above without causing pain. The essential element to be added is the muscular support which comes from muscles having their origin in the calf and their insertion in the tarsus. It is to these structures that the arch owes its ability to withstand the strain of standing, walking, and sustaining the weight of the body. The impression, so prevalent, that the arch actually sinks under strain is based upon the appearance of the foot when weight is thrown upon it, in consequence of which the foot rotates outward on its long axis, or pronates in the anatomical sense. The arch is no lower than ever, but because of this rotation the inner border of the foot appears to be lower than normal, but can be easily restored manually, unless the condition has persisted so long that rigidity has developed. Before leaving this résumé of the skeletal anatomy of the foot it should be said that there is a congenital type of valgus where the bones are related to each other in such a way that the scaphoid and the entire inner skeletal border of the foot are abnormally near the floor when the patient stands. The peroneal, posterior and anterior tibial muscles are the ones sustaining the greatest strain in the maintenance of the functions of the feet.

The element of fatigue induced by a disproportionate amount of standing is of more influence than that caused by exercise even to

excess. In other words, the ability of a muscle to contract and do its duty under stress is much less when the fatigue comes from unremitting tension than when tension changes constantly, as in walking. It is for this reason that those who change from one sort of duty to another involving a change in the relative amounts of standing and walking and the character of the surfaces upon which the work is done are the ones who break down first under the stress. In civil life it is seen most among those who take up, for example, positions as clerks and are obliged to stand behind counters with comparatively little occasion or opportunity to walk and exercise their leg muscles. The same thing is true of cases seen in naval practice. Men come into the service from all sorts of occupations, are put to strenuous work on decks with small opportunity to get any continued exercise in the way of walking. They are set to drilling without any reference to previous conditions of occupation or training. The normal foot will, in the majority of cases, stand up even under such rapid shifts without showing any tendency to give way. The foot, however, which is not up to standard will not behave as well, and unless carefully handled may go on to a state of considerable disability. In this type of case faulty shoeing or any improper method of poising the body weight over the foot may be the determining factor in causing the symptoms.

There is no opportunity to determine what, if any, pathology or abnormal tissue change there may be in the conditions under consideration. The sweating and congestion of the feet indicate that there has been some interference with circulation, probably due to the muscles of the leg not acting in their capacity of auxiliaries to the heart in sending the blood on its return course. If they are stretched out and are not giving their normal contractile impetus, then it is easy to see that the part they play in assisting the circulation of the blood would be interfered with. The hyperhydrosis is probably dependent upon the circulatory disturbance.

The next stage after this initial condition of congestion and hyperhydrosis is a stage of spasmodic irritability of the muscles supporting the arch. This occurs chiefly in patients whose arches are naturally rather high. I believe that the cause of the spasm is a congestion and injection of the small tarsal articulations, caused by abnormal pressure induced by the development of pronation, which, in turn, is induced by slacking off in the muscle tone of the groups controlling the arch. Inasmuch as the posterior tibial group of muscles is weaker than the peroneals, the spasm of the peroneals reflexly induced by this tarsal irritability tends to pull the foot over into a position of extreme eversion. At first it may be overcome manually, if gradually attempted, but later may require a general

anesthetic to correct the position. If this extreme rigid pronation is permitted to continue, and particularly if the patient keeps about on his feet, adhesions will form; and, later still, erosions of the cartilage covering the articular surfaces of the tarsal bones may occur, which render the feet permanently rigid.

Every foot has the possibility of eventuating in this if it is one of the well-arched types. The low-arched feet rarely pronate and therefore are not as liable to develop intertarsal rigidity and adhesions. The high-arched foot is to be the most feared once symptoms begin in it, particularly if the symptoms are accompanied by the above-mentioned physical signs.

The symptomatology of weak or flat foot comprises two sorts of subjective symptoms. In the first place the patients note a tendency to have a tired, strained feeling in their calf muscles, this to be very soon followed by discomfort amounting later on to real pain in the tarsus, usually referred to the inner malleolus and the scaphoid region, but later to the outer side of the ankle, in front of and below the external malleolus. Sometimes there is pain in the plantar fascia on pressure and a knotting up of this fascia or the muscles associated with it. The calf muscles become tired and pain is referred to the knees and occasionally to the muscles of the thigh and even to the lower back. In this early stage congestion and sweating are the common phenomena, and tenderness to pressure over the points of attachment of those fascial bands whose duty it is to hold the tarsal bones together is the rule. Following closely on this stage one observes the muscle spasm above referred to and the tendency to develop pronation of the foot. As a final stage this condition may go on to one of bony ankylosis of the tarsal articulations.

There are not many things from which flat foot should present difficulties in differential diagnosis. Arthritis, confined to the feet, is rare except in gonorrheal infections. In this situation there is much more swelling in local articulations with thickening and tenderness referred to these joints. Sweating and passive congestion are common to both conditions. There is muscle spasm guarding the motions of the affected joints, but because of the multiplicity of the joint involvements the foot is restricted as to its motion in more ways than is the case in flat foot, where it is usually only on inversion of the foot that spasm is noted. Traumatic lesions of the foot and the occasional osseous infections or neoplasms can scarcely cause difficulty in diagnosis if reasonable care is observed in the history taking and examination.

In view of what has gone before in this discussion, if its principles are accepted, the matter of treatment is reduced to a comparatively simple proposition, and should depend upon the stage in which it comes under observation. If in the congested, sweaty stage, with

but slight or no pronation and no muscle spasm, five or six days off the feet, accompanied by bandaging, massage, and alternate douching with hot and cold water is usually enough to relieve the acute symptoms. At the end of that time the patient may be permitted to be about on the feet, continuing the bandaging and showers, and should be given, in addition, foot exercises to better the tone of the calf muscles.

If the second stage has been reached where there is tenderness to pressure over the conventional points and where muscle spasm has commenced, holding the foot in a faulty position, then fixation in a cast, after overcoming the spasm should be instituted for from a few days to a week or two. After removal of the cast then proceed as in the first stage, after the period of rest has been passed. In this class the question of employing some form of support for the arch may arise, if the opportunity for continued exercise and massage treatment can not be had. In such a case a cast of the foot in plaster should be taken and a plate carefully fashioned over this cast when properly raised.

In the third stage, where the foot is rigid, it is useless to do anything until the rigidity can be overcome, either with or without an anesthetic. If with an anesthetic it will require at least three weeks of fixation in an overcorrected position in plaster of Paris, before it will be proper to start on treatment with massage, exercises, and hydrotherapy, as before described. It is better in these cases to use supports for a time after walking is permitted, for the reason that the tarsal joints after having their adhesions broken up are tender and require protection for a time before they can be permitted to bear weight.

Much diversity of opinion has been expressed regarding the treatment of flat feet. It seems to me that under conditions where absolute control of the patient is possible there is rarely any necessity for apparatus treatment, and that a period of time under hospital supervision, which should not exceed that ungrudgingly allotted to a case of appendicitis or other major surgical procedures, should straighten out these cases. If proper precautions are observed in regard to muscle-training exercise afterwards, there should be but little liability to relapse. No complicated system of muscle training is required; merely an insistence upon the daily, systematic performance of a simple group of exercises accompanied by hot and cold douching of the feet, and massage where it is possible to obtain it.

The cases where plates are necessary are those in which the condition has gone on to adhesion formation and have had to be broken up forcibly, or where the conduct of the case can not be absolutely supervised, or a reasonable amount of rest and attention given.

A discussion of the operative treatment of the extreme deformities occasionally met in these patients need not be entered into here, as no such degree of deformity would be likely to be admitted or develop in the naval service.

The following are the exercises which have been found sufficient to restore these cases to functional activity if faithfully followed.

1. Flex foot; extend foot; circumduct foot, alternately and in both directions.
2. Curl toes.
3. Feet parallel, roll up on outer borders.
4. Turn toes in, rise on toes.
5. Foot placed on floor. Keep ball of great toe and the heel on the floor and lift the inner border of foot as much as possible from the floor.
6. Resistive exercises for strengthening the peroneal and posterior tibial as well as the anterior tibial and gastrocnemius groups. The resistance may be manual or by means of spring balances, weight and pulley, or elastic resistance.

The exercises should be done twice per day, from 15 to 30 or 40 time each. After the exercises there should be a short period of hydrotherapy and massage. The exercises should be performed slowly.

Important as the treatment of flat or weak foot is, when we are confronted with the cases requiring measures to restore them to duty, it is infinitely less significant than prophylactic treatment. It should be recognized that not all feet are equally well formed to withstand certain of the strains to which they may be subjected. Such feet in the vast majority of instances may be fortified by proper muscle training. Desirable as this may be in every case where the change of duty from civilian life to naval life involves a very radical change in the amount of strain to which the foot will be subjected, it is absolutely imperative, where the element of pronation is present to a considerable degree and where, as is usually the case, the peroneal tendons are disproportionately strong for the posterior tibials. It has been demonstrated that where the relative strength of these two muscle groups is not properly proportioned, the number of flat-foot cases developing is much higher than is the case where the proper ratio obtains. So constant is this that a number of nurses' training schools reject candidates if they are below par in this respect, or until they have come up to standard. Something of this sort should be employed in determining the efficiency of the feet of candidates for admission to the Navy. It would certainly lessen the amount of time lost to the service. Consideration should be given to the work that a man has done before entering the service in deciding upon the rapidity with which he is forced to do deck duty of any sort which requires much standing and little opportunity for intermitting muscular contracture.

What shall be said for that most discouraging class of patients whom the naval surgeon has to see every morning at sick call,

whether afloat or ashore, who complain of all sorts of pains in their feet and refuse to do their duty on this account? The term "flat foot" is in such general use and is popularly known to be so disabling that it is worked "overtime" in the service by those who desire to get out of distasteful details or secure their release from their enlistment. Everyone who has had any experience knows that a large number of those making these complaints are doing so for one or the other of these reasons and the men themselves know that if they persist long enough in presenting themselves at sick call with that complaint that they will be surveyed as "undesirables," or transferred to shore duty, or something will occur that will mean a change, and that is what they want.

It is a safe rule to apply to cases of this sort that, if the complainant has had no trouble with his feet in civil life in an occupation that was putting a similar stress upon his feet and has had no debilitating sickness which might have lowered his muscular tone, while at the same time, on physical examination, there is no congestion, spasm of muscle, limitation in motion of tarsal joints, or tenderness over the points of attachment of muscles used in moving the feet, the man is employing his knowledge of the symptoms of flat feet to pry himself out of the service. I am in the habit of putting all such cases to bed at once. In the "fake" cases the symptoms still persist in almost every case, whereas in the real cases there is a marked improvement in both subjective and objective symptoms and signs. The "faker" is pretty certain to trip up in the way he refers his pain to all sorts of localities, and when aided by suggestion of impossible places he is quite willing to "go the limit" with the sympathetic examiner in making out his case as bad as may be. Having satisfied oneself of the essential unreality of the symptoms complained of, the restriction of liberty and insistence upon the irksome routine of foot exercises will bring most patients to time and they will ask to be returned to duty. One can generally make perfectly legitimate and proper treatment so distasteful that the patient will soon be convinced that the treatment is far worse than the disease which he has chosen to simulate.

STATIC DEFECTS OF THE LOWER EXTREMITIES.

By A. A. MARSTELLER, Lieutenant, Medical Corps, United States Navy.

So forcibly have I been impressed, many times, by the fact that weak feet are not always dependent upon the height of the arch, that I feel justified in describing here a certain type of foot which frequently presents itself at the recruiting station, and offers a most perplexing problem for the medical officer. What I particularly

wish to emphasize and bring out are the postural defects, which may or may not be accompanied by actual flat feet, but are of importance because they bear a direct influence upon the recruit's future usefulness. By far the greatest number of rejections for any one condition for enlistment in the Navy in my series of examinations has been for flat feet. Of 7,636 applicants for enlistment 436 were rejected for this reason. I do not believe that these figures were influenced to any great degree by the locality from which these applicants came.

Upon the examination of the normal foot, the posture in walking should be one wherein the feet are parallel to each other, the line of weight passing down through the center of the knee, center of the ankle, and out through the second toe. (See fig. 1.) This distributes the weight through a vertical plane, parallel to and over the center of the longitudinal arch of the foot. Any amount of weight in this position, up to the point of actually tearing loose the supporting ligaments, will have no effect upon the arch. The arch being a suspension structure, the supporting ligaments of which are attached to its extremities underneath, can stand a definite amount of weight, in direct proportion to the strength of the ligaments and the height of the curvature of the arch. With a given amount of weight or force exerted from above, it will be readily seen that there is a greater degree of tension on the ligaments of the low arch than on those of the high one. Consequently a low arch, even if within normal limits, is more readily broken down than a high one. In the normal foot the tubercle of the scaphoid bone should not be more than one-half inch below the "Feiss Line" (a line from the tip of the internal malleolus, to the lower border of the first metatarsophalangeal joint). A greater distance than this would cause too much tension for normal or even extra strong ligaments to withstand, under service conditions.

There are many cases, however, which come within these normal limits, but on account of faulty posture are obviously unfit for service. These static defects are primarily due to an external rotation of the lower extremity, which may commence either in the hip joint, in the knee joint, or in the ankle, accompanied by a relaxation of the internal lateral ligaments of the ankle joint, and a condition wherein the os calcis has been displaced inward from its central position on the pad of thick superficial fascia of the heel, upon which it rests. These, according to their degree, tend more or less to abduct and evert the foot, which in turn throws the weight of the body out of its normal plane, so that its greatest force is exerted diagonally from above and to the outer side of the arch. In this posture, a weight not sufficient to tear loose the supporting ligaments may cause

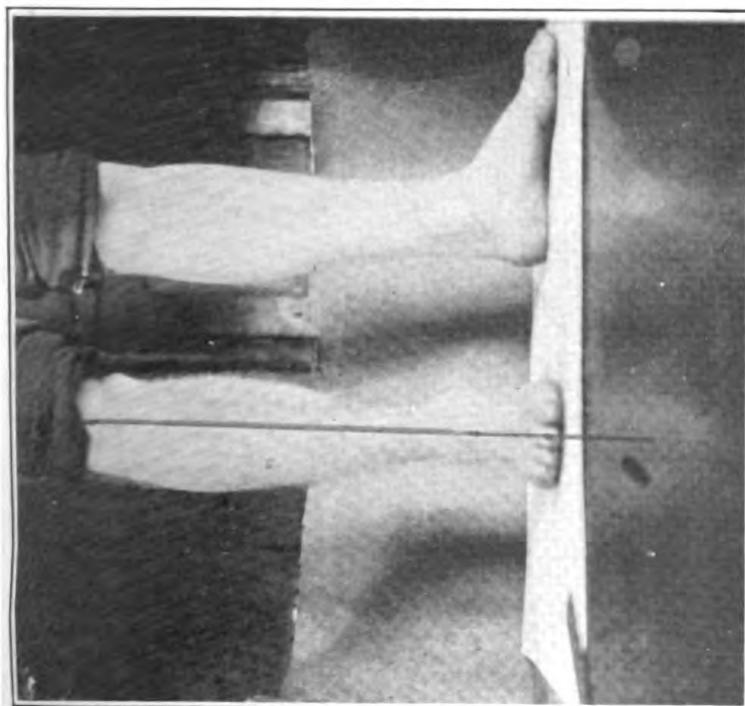


Fig. 1.—Normal feet. Vertical line shows the plane through which the weight normally falls.

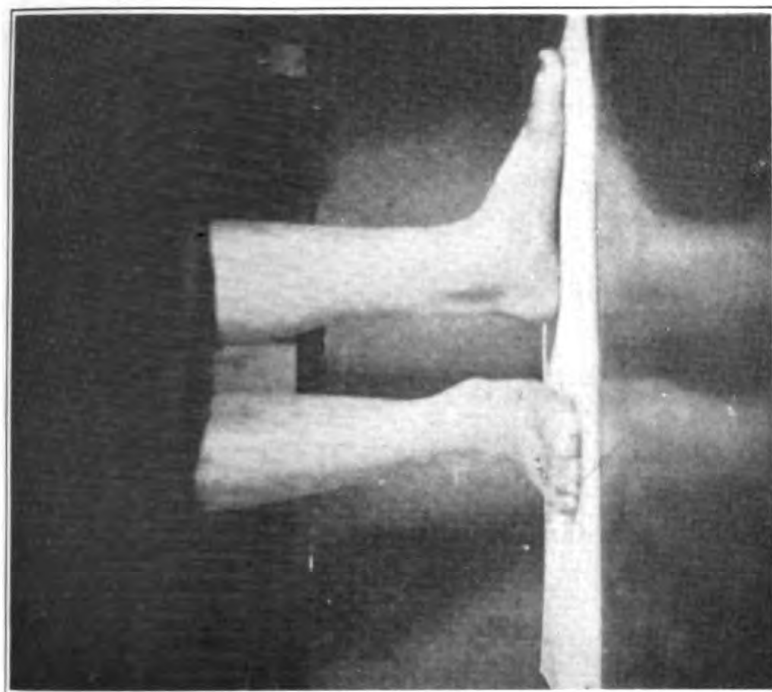


Fig. 2.—Case 1. Scaphoid tubercle, $\frac{1}{4}$ inch below Feiss line (both feet). Relaxation of internal lateral ligaments and considerable eversion. Rejected.

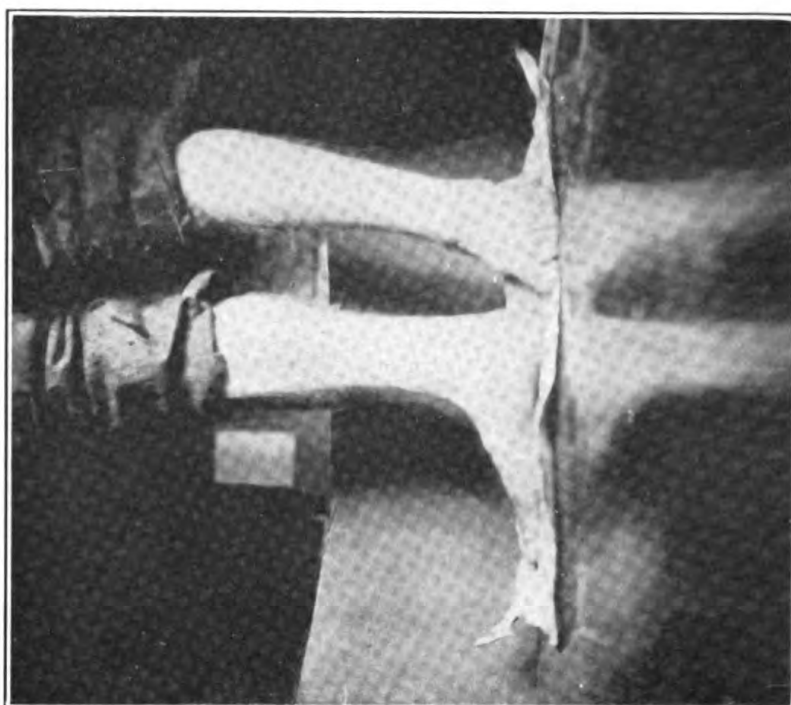


Fig. 4.—Case 2. Lateral view, showing height of arch.

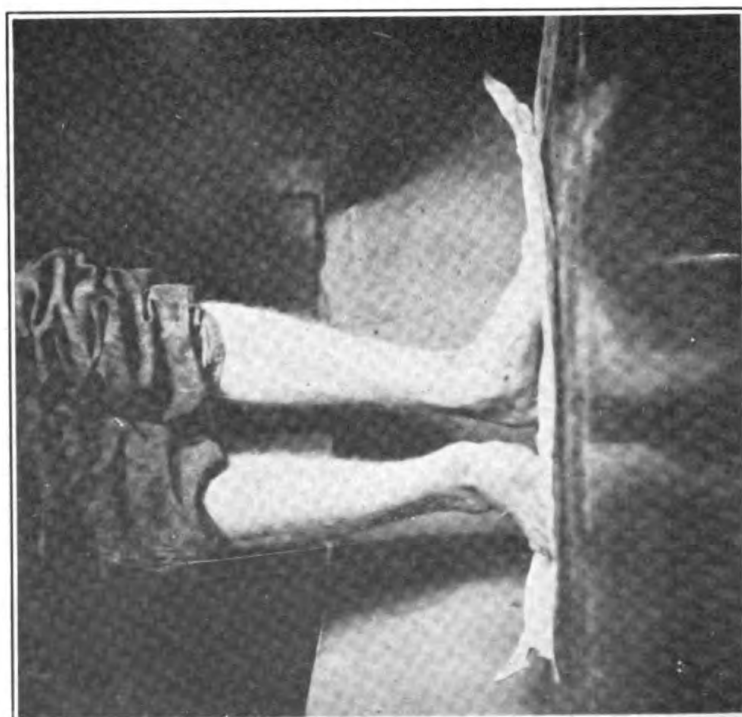


Fig. 3.—Scaphoid tubercle, $\frac{1}{2}$ inch below Feiss line (both feet). External rotation, relaxation of internal lateral ligaments and eversion. Rejected.

the arch to collapse sideways, and produce a tendency to, or actual, talipes valgus.

While the arches are not really low, these feet should be just as much a cause for rejection as actual flat feet. The weight being thrown out of its normal plane, gains leverage, and by an excess of tension upon the ligaments which hold the arch in its upright position will just as surely cause pain and discomfort as will an ordinary weight upon the supporting ligaments of an abnormally low arch.

As yet we have no fixed rule or guide to go by in diagnosing the degree of weakness in these cases. Each one must be judged upon its own merits. One should constantly bear in mind that many cases of weak feet come up to the required measurements for a normal arch. However, great care and discrimination should always be used not to reject those which do not rightly belong in this class of weak feet.

I am indebted to Chief Pharmacist's Mate T. H. Clark, United States Navy, for obtaining the proper photographs to illustrate these cases.

SATISFACTORY TREATMENT OF MALARIA.

By W. H. MICHAEL, Lieutenant Commander, Medical Corps, United States Navy.

In 1917, while at Cape Haitien, Haiti, in reviewing cases of malaria which continued to relapse under perhaps a poor modification of the Canal Zone treatment, a search was made for a more satisfactory malaria treatment. At about that time Dr. A. Ochsner published, in the Journal of the American Medical Association, a treatment which had proved satisfactory in his hands while in Mexico. A modification of this treatment was adopted at once, at the field hospital, Cape Haitien, by Dr. E. U. Reed, then in command of the hospital. Though it proved successful as observed, both Dr. Reed and the undersigned left Haiti very soon after, so that collection of any exact data was impossible. The treatment in a modified form was again used with fair success in the management of about 20 cases occurring in sick quarters No. 1 at Quantico, Va., in the fall of 1917, but as the Virginia fever is almost invariably benign tertian it was considered dangerous to draw any definite conclusions as to what would hold good in the treatment of the disease as a whole, and especially in the treatment of the tropical varieties.

The treatment is briefly covered in the circular letter below, a copy of which has been forwarded to each of the 28 outposts of the Eastern District, Dominican Republic, for the use of the medical officers and hospital corpsmen of the district. The principle of the treatment is based on the well-known fact that quinine is only effective in killing the malaria parasites at the time of sporulation and

that after a week the sexual forms probably pass over into the asexual forms. These changed forms, however, are killed during the second course of quinine. The treatment, then, has as its object, to render the blood plasma toxic by quinine to the sporulating parasites for two full cycles of the parasite. This is done by two courses of treatment with an interval of five days between. It is hoped that the sexual forms may pass over in this interim to asexual forms and be killed by the second course of quinine.

A prophylaxis is prescribed, not with the idea of keeping malaria in check but to abort the disease before it really becomes established in the body.

The routine treatment, as outlined below, has been given in all cases of malaria admitted to the field hospital, San Pedro de Macoris, Dominican Republic. The present series represents cases admitted from October 15, 1919, to December 31, 1919. There are 25. All are definite unquestioned cases of malaria, and the majority were confirmed by microscopic examination. All of these cases failed to show fever during the interim of five days and none showed over 101° during the second course of quinine.

In five cases it was necessary to give quinine intramuscularly or intravenously during the period of vomiting. In these cases quinine was given in proportion to the amount lost in vomiting.

Of these cases all were treated in a very malarious country and were returned to duty, usually at the same post where they had first contracted the infection, so that if some had returned for malaria treatment they might be accounted for by reinfection. In spite of this fact and the additional fact that no case is reported which was discharged to duty less than two weeks before the present writing, no case has returned for treatment for malaria.

It is realized that the routine treatment, as described, would not be logical or efficient in case of quartan fever. However, as these quartan cases are so rare, if present at all, in the island of Haiti, it was not considered well to include them in a routine treatment. In dealing with such cases it would be logical to add 24 hours to each course.

The use of quinine as described below in the treatment of malaria has many advantages over the usual treatments. (1) It seems to be better in that relapses at least are not frequent. (2) There is little or no complaint of buzzing ears by the patient. (3) Only about one-half the quinine is used as compared with the old Canal Zone treatment. (4) All the quinine is given in the hospital and none left to the patient to be taken afterwards, or forgotten. (5) It is simple to give; all that is necessary is an alarm clock and a supply of 3-grain quinine tablets or capsules. (6) Absorption is insured by liquid diet and a clean alimentary canal.

The use of quinine, as herein described, has given so much satisfaction, both at the field hospital at San Pedro de Macoris and in the Eastern District, that its trial is advocated. It was adopted by the writer, for the treatment of malaria in the Tropics, with a great deal of skepticism as to its efficiency. However, a three months' trial has removed most of this doubt, and it is considered the best treatment that has yet come to the author's knowledge.

QUININE SUGGESTIONS IN MALARIA.

1. No quinine to be given except in the following cases:

(a) A prescribed prophylaxis to be given weekly where exposure to infection is constant, or in specific cases where infection has already taken place, as after field work, in highly infected areas, either by a detachment or by individuals.

(b) Doses to be given on the march in order to keep individuals who are threatened with an attack of malaria on their feet where the military necessity warrants such treatment.

(c) To be given in the treatment of a diagnosed case of malaria.

PROPHYLAXIS.

1. Magnesium sulphate, $1\frac{1}{2}$ ounces.

Saturday a. m. before breakfast.

2. Quinine grains 12 before noon meal.

3. Quinine grains 15 at 6 p. m.

4. Quinine grains 12 Sunday morning 6 a. m.

NOTE.—Ten grains at once and 3 grains every 2 hours for 24 hours would probably be more effective but is not considered practical except in selected cases.

IMPORTANT.

The indiscriminate use of quinine tends to produce an infectious strain of malarial parasites very resistant to the drug and is considered one of the principal causes of relapse after what otherwise would be sufficient treatment.

ROUTINE TREATMENT.

One-half to one glass of water to each dose of quinine.

First day, 8 p. m.—Calomel grains 2.

Second day:

6 a. m.—Magnesium sulphate 2 ounces; liquid diet; bed patient.

8 a. m.—Quinine sulphate grains 10.

10 a. m.—Quinine sulphate grains 3, and every two hours thereafter, *continuing through the night.*

Third day: Quinine grains 3 every two hours; liquid diet; bed patient; *continue quinine through the night.*

Fourth day: Quinine grains 3 every two hours; liquid diet; bed patient; *discontinue quinine at 5 p. m.; full diet for supper.*

Fifth day

Sixth day

Seventh day

Eighth day

Up and about. Full diet. Tonic, not containing quinine, if indicated.

Ninth day : Same as eighth day except calomel grains 2 at 8 p. m.
 Tenth day : Same as second day.
 Eleventh day : Same as third day.
 Twelfth day : Same as fourth day.
 Thirteenth day : Full diet ; no treatment.
 Fourteenth day : To duty.

TREATMENT "B."

To be used as a makeshift treatment and only when the routine treatment is entirely impractical, as at the small outposts *where there is no doctor*.

First day, 8 p. m.—Calomel, grains 2.

Second day :

6 a. m.—Magnesium sulphate, 2 ounces ; as near liquid diet as possible ; bed patient.

10 a. m.—Quinine sulphate, grains 10.

12 noon.—Quinine sulphate, grains 10.

6 p. m.—Quinine sulphate, grains 10.

12 midnight.—Quinine sulphate, grains 10 (to be given by the sentry on watch).

Third day :

6 a. m.—Quinine sulphate, grains 10 ; diet and bed patient same as second day.

12 noon.—Quinine sulphate, grains 10.

6 p. m.—Quinine sulphate, grains 10.

12 midnight.—Quinine sulphate, grains 10 (to be given by the sentry on watch).

Fourth day :

6 a. m.—Quinine sulphate, grains 10 ; diet and bed patient same as second day.

12 noon.—Quinine sulphate, grains 10.

5 p. m.—Quinine sulphate, grains 10.

5.12 p. m.—Discontinue treatment ; patient up ; full diet.

Fifth to tenth day : Patient up ; full diet, and if feeling well allow to do duty, but give calomel, grains 2 at 8 p. m. on tenth day.

Eleventh day : Same as second day. *Regardless of how well* patient feels.

Twelfth day : Same as third day.

Thirteenth day : Same as fourth day.

NOTE.—The important points are a good purge before beginning quinine ; water with every dose of quinine ; a liquid or starvation diet during quinine ; patient in bed during quinine ; and the regular doses as prescribed.

IN SEVERE CASES.

Where vomiting is continuous, 1 quart of warm bicarbonate solution by rectum every 4 hours supplies water.

Intravenous chlorohydrosulphate grains 7 given *very, very slowly* in about 15 mls. of water every 4 hours until buccal method can be resumed, or intramuscular chlorohydrosulphate grains 10 given in from 6 to 10 mls. of water every 4 hours until buccal method can be resumed.

Ten minutes massage in injected area after injection *intramuscularly*.

If no hypodermic is available, give 20 to 30 grains of the chlorohydrosulphate ; or if not available, 1 dram of the sulphate in 1 pint of warm water by rectum.

Use other stimulants as indicated.

POST-BELLUM NAVY RECRUITING.

By A. H. CECHLA, Lieutenant, Medical Corps, United States Navy.

It is possible, now that peace recruiting has been reestablished and progressing for more than a year, to make a few remarks and give some views relative to the medical side of recruiting as it presents itself to the examiner at this time. One who was in the recruiting service before the war has had the opportunity to observe the changes which have gradually been taking place and the new conditions which must be considered with recruiting. Most of these changes are due to the war and have produced a situation which is perhaps only temporary.

It is true, as has often been stated, that the health and vigor of the Navy depend upon the good work of the recruiting station; that is to say, upon the medical officer, for according to his judgment border-line cases are either accepted or rejected for the service. These border-line cases are the men who form a large portion of the frequenters of the dispensary, and many ultimately must be given a medical survey. The desirable man for a recruit is a large, strong, robust individual, but to-day the largest number of applicants are persons who have not seen any form of war service, which necessarily limits the number to men between the ages of 18 and 21, and by far the greater proportion of these, at least at this station,¹ fall into the 18-year class. Since this condition has brought so many youths into the service, the result has been to emphasize the minimum-weight limit and to require a strict adherence to the other Navy standards. On this account it is more difficult to increase the number of enlistments, even though much greater effort is being put into recruiting than ever. However, quality should not be sacrificed to numbers, though there are times when the border-line cases, if enlisted, would improve the station's standing.

There are numerous applicants who are desirous of entering the Navy and are well qualified physically but are barred out of the service on account of being under age. Evidently from the circulars showing discharges for under-age enlistments there are men who manage to enlist by misrepresenting their age. By requiring every applicant under 21 years to have a signed parent's-consent paper and the true age thereby verified, it is possible to eliminate most of these under-age enlistments and the future expense and annoyance which are the result of such enlistments. By questioning these men some of these fraudulent cases can be detected in the examining room.

Some reserve men and duration-of-war men are returning to the Navy after being relieved from active duty. These men should receive as thorough an examination as original applicants, for in the

¹ Manchester, N. H.

rush of the war examinations there was a possibility of overlooking some defect which is a cause for rejection, such as color blindness, defective vision or hearing, or some minor defect which should be noted in the health record.

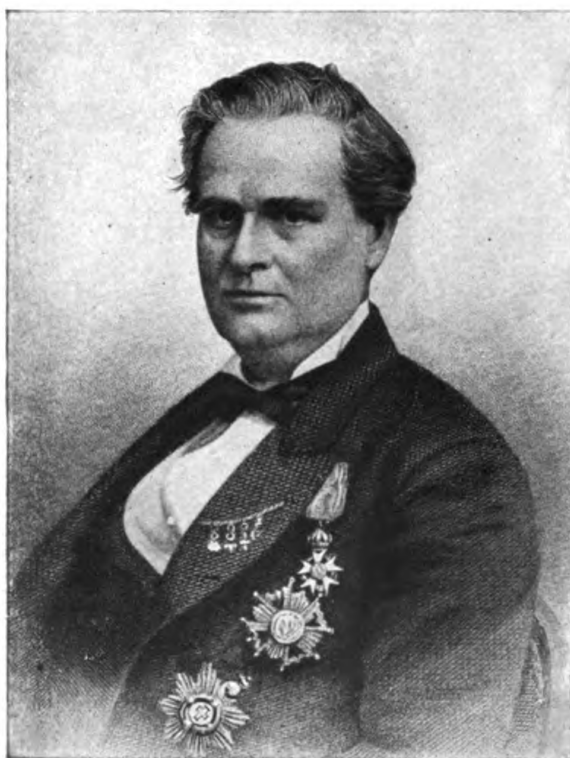
An adjunct to recruiting which has been recently added to the medical officer's department is the finger-print index system for the purpose of apprehending fraudulent enlistments at their source. This class of man, apparently increased by the war, is taking advantage of the recruiting office to get railway transportation from one city to another. By having finger prints of all this type of men it may be possible to stop the practice altogether. There are other cases to which this system can be applied with advantage to the medical department. These are the undesirables discharged after expiration of their term of enlistment, dishonorably discharged men, and certain medical survey cases, as insane individuals, epileptics, and those suffering with chronic disorders which might be overlooked by the examiner. The value of this system lies in its permanency as well as in the rapidity with which one can go through a long list of undesirables.

A very important benefit derived from the war is that most of the young men of military age have received a medical examination, and in most instances have been under observation in some camp or station so that their former examination and service record can help to form, in doubtful cases, an opinion as to health and endurance for a naval career. A man who has been examined and not inducted into the military service, or who was sent to a camp but later sent home, usually has been rejected on account of some physical or mental condition which renders him unfit for a military as well as naval service. By questioning such applicants not a few weaklings can be eliminated immediately and diverted from the Navy.

It is desirable to enlist more men into the Hospital Corps of the Navy to promote its efficiency and value to the service. It seems that most of the young men prefer the ratings in mechanical lines because of the emphasis which has been placed upon the value of trades in the future and the excellent training which the Navy schools offer in these lines. It is only by explaining the nature and desirability of the Hospital Corps that some of these men better qualified for the Hospital Corps than for the other branches are inducted into this branch.



Ephraim McDowell (1771-1830).



James Marion Sims (1813-1883).

(From Garrison's "History of Medicine." Courtesy of W. B. Saunders Co., Philadelphia, Pa.)

HISTORICAL.

EPHRAIM McDOWELL AND J. MARION SIMS, THE AMERICAN FOUNDERS OF GYNECOLOGY.

Ephraim McDowell, born in Rockbridge County, Va., March 11, 1771, was of Scotch descent, his ancestors having belonged to the clan of Argyle. The persecution they had to endure upon embracing the Covenant drove them to Ireland and finally to the Valley of Virginia. From there his father, a land commissioner, moved to Danville, in what is now the State of Kentucky, when Ephraim was 11 years of age.

After two or three years devoted to the study of medicine under a preceptor in Staunton, Va., McDowell went to Edinburgh, and it was there that he first felt that profound and vibrating sympathy for the hopeless predicament of women suffering with ovarian tumor, as described by his teacher, John Bell, which 16 years later inspired him to undertake the work that made him famous. He began the practice of medicine in Danville and was soon known as the most fearless and able surgeon west of the Alleghenies. There were no railroads, and no turnpikes even, at that time, but patients came from great distances to consult him, and when unable to travel he went to them on horseback, often riding hundreds of miles. He had no specialty, but undertook everything, from amputation to tracheotomy. By 1828 he had done 22 lithotomies without a death, no mean record for any man and a very remarkable one when the times and circumstances are considered. The town where he lived had but 500 inhabitants and the nearest hospital was 1,000 miles away, and so most of his operations were done in the primitive homes of village and countryside and often his assistants were neighbors or members of the patient's family.

McDowell had been practicing for 14 years when he was summoned to a patient 60 miles away who was suffering with a large and painful tumor which McDowell diagnosed as ovarian, contrary to the opinion of the other physicians who had seen the case. The interview was a memorable one. Physician and patient were equally courageous—they were Scotch. McDowell offered to operate, but carefully explained that he had never attempted anything of the kind before and that it would be in the nature of an experiment. There was the risk of death for her, while he risked only the loss of reputa-

tion and perhaps professional ruin. Mrs. Crawford was not appalled by the surgeon's words and the prospect of a difficult journey on horseback, though she was 47 years old and greatly hampered by her condition. She declared that she would prefer death in any form, except of course deliberate suicide, to the lingering and horrible one that awaited her, and bade him undertake the operation if it offered even the smallest promise of success. McDowell removed the tumor. The patient recovered and lived to be 78. (The date of operation was the winter of 1809.)

McDowell did not report the case for seven years, and by that time had two more of the kind, with recovery, to his credit. He sent the account to his old teacher, but Dr. Bell had left Edinburgh and was traveling abroad for his health and the paper never reached its destination. It was published, however, in Philadelphia and provoked criticism and challenge. The editor of a London review utterly discredited the facts set forth, but later humbly apologized to God and to McDowell, confessing that "a back settlement of America" had "beaten the mother country, nay Europe itself" "with all its boasted surgeons" in a "fearful and formidable operation."

In 1819 McDowell reported two more successful cases, and his reply to previous criticisms is worth recording.

"I thought my statement sufficiently explicit to warrant any surgeon performing the operation, when necessary, without hazarding the odium of making an experiment, and I think my description of the mode of operation and of the anatomy of the parts concerned clear enough to enable any good anatomist, possessing the judgment requisite for a surgeon, to operate with safety. I hope no operator of any other description will attempt it. It is my most ardent wish that this operation may remain to the mechanical surgeon ever incomprehensible. Such have been the bane of the science intruding themselves into the ranks of the profession, with no other qualification but in boldness in undertaking, ignorance of their responsibility, and indifference to the lives of their patients; proceeding according to the special dictate of some author as mechanical as themselves, they cut and tear with fearless indifference, incapable of exercising any judgment of their own in cases of emergency; and sometimes without possessing the slightest knowledge of the anatomy of the parts concerned. The preposterous and impious attempts of such pretenders can seldom fail to prove destructive to their patients and disgraceful to the science. It is by such the noble science has been degraded, in the minds of many, to the rank of an art."

In all, McDowell performed 13 ovariectomies with 8 recoveries, 1 failure, and 4 deaths, a mortality of 30.76 per cent. One of the favorable cases was operated on with Gen. Jackson and a Mrs. Priest as sole assistants. The fee charged was \$500. When McDowell pre-

sented the check for payment he found that it was made out for \$1,500 and immediately sent a messenger to the patient's husband notifying him of the error. The man replied that there was no mistake and that he would have paid a great deal more had he been able to afford it.

McDowell was popularly held to be as timid in medicine as he was bold in surgery, and did not inspire confidence. This was because he did not employ the drastic measures which prevailed in his day and declined to administer the huge doses of calomel then in vogue. He was opposed to drugging, but by no means lacking in courage and originality in the treatment of medical cases. He allowed fever patients to drink all the water they wanted and used affusions and baths for such cases. This required courage 100 years ago.

McDowell was a man of sterling principle, generous, kind hearted, and approachable. He was a good scholar, loved reading, and possessed a fine library. His favorite diversion was the study of history and literature. While he is said to have abominated writing, the reply to his critics, quoted above, shows that he could be as forcible with his pen as with the scalpel.

Attempts have been made to dispute McDowell's title of originator of ovariectomy, but the investigations of S. D. Gross and others have clearly established it. Galenzonski's case was treated 18 years after McDowell's first operation; Dzondi's was a gastrotomy on a boy! Robert Houston, of Glasgow, operated on an ovarian tumor, but did not remove it. He says: "I squeezed out all I could and stitched up the wound in three places almost equidistant." L'Aumonier, of Rouen, in 1776 had likewise evacuated but not removed the cyst.

Nathan Smith, without knowing of McDowell's work, performed one ovariectomy with success in 1821. Chrysmar, of Germany, had performed the operation three times by 1820, thus antedating John Lizars, of Edinburgh (he reported four cases in 1825), into whose hands had come McDowell's communication to John Bell. Charles Clay, of Manchester, and Frederick Bird, of London, came next, and then the Atlee brothers, of Pennsylvania. Clay by 1874 had done 276 ovariectomies. In a period of 10 years he saw and examined 850 cases. John L. Atlee, prior to his death in 1885, had done 78 ovariectomies with 64 recoveries, and Washington L. Atlee had 387 to his credit prior to 1878. T. Spencer Wells, of London, in April 1879, had performed ovariectomy 938 times. The operation was first performed in France in 1847. It is clear, then, that McDowell opened up a new and important field in surgery. His tombstone is inscribed only with his name, but his works endure, an eternal monument.

McDowell's work marked a new era. His contribution to the reduction of the suffering and mortality due to a disorder peculiar

to women was enormous, but there was still no *systematic practice of succor* for them. The operation of ovariectomy was not operative gynecology. There was no class of practitioners devoted wholly to the treatment of diseases of women, and there were no hospitals maintained exclusively for them. Furthermore, one frequent and horrible consequence of improperly managed obstetric cases was the vaginal fistula into bladder or rectum, a condition for which there was no hope in surgery until the brilliant achievements of J. Marion Sims, who devised a radical cure for it, established the first woman's hospital, and created the specialty of operative gynecology.

To-day vaginal fistulas are rare because accoucheurs are more skillful and interference to prevent undue protraction of the second stage of labor is considered proper and facilitated by anesthesia. Hence it is not so much the cure of fistula as the methods he advocated and the intensive study and specialized treatment he inaugurated which entitle Sims to lasting fame. Maisonneuve claimed to have cured one case, and in America six cures were claimed by Mettauer, of Virginia, and a few by George Hayward, of Boston, and Joseph Pancoast, of Philadelphia, but when an operation for the relief of the condition was undertaken the result was always a matter of uncertainty until the adoption of the methods of Sims, which made *failure* improbable.

John Peter Mettauer, of Virginia, whose father came to this country with Lafayette, was a country practitioner of incredible surgical skill who, from his preference for country life and perhaps because of numerous eccentricities, has never received full credit for his performances. (At home or abroad, whether teaching, operating, or attending a confinement case, he always had on a tall beaver hat, and it is said that he left directions to be buried with it on.) He was successful in operating on a case of vesico-vaginal fistula one year before Hayward and 10 years before Sims, using lead sutures and a huge shell-shaped speculum of his own devising. He operated 800 times for cataract and 400 times for stone in the bladder. His extant writings testify to his original mind and wide range of talent. He was a popular teacher and greatly esteemed as a physician.

J. Marion Sims was born in Lancaster County, S. C., January 25, 1813. After graduating at the Jefferson Medical College of Philadelphia he began practice in his native State, but had no great success at first and was more than once on the point of giving up medicine. Indeed, one of the striking facts of his life was his utter lack of that consuming devotion to his calling which accounts for the ultimate success of many men, but certain peculiar circumstances having once confronted him with a baffling problem he became wedded to the work entailed by its solution and through good health

and bad, through adverse and favoring fortune, stuck to his task and all it involved with the passionate earnestness of genius.

It was while practicing in Montgomery, Ala., where he had become known as a very capable surgeon, that a friend brought to his notice a slave, Anarcha by name, whose existence was made unbearable by an extensive vesico-vaginal fistula. Though protesting that he felt sure he could do nothing for her he consented to try, and lodged her in a cabin on his premises. His first attempt was a signal failure; and, though the patient herself was willing to undergo further treatment, Sims would have given up but for an event which, as he thought, gave him a clue to the riddle. A woman of the neighborhood was thrown from her horse and suffered a displacement of the uterus. Sims hated above all things to make an examination of the pelvic organs; but it was his duty to try to help when sent for, so he proceeded to put her in the knee-chest position and attempt reduction, in the manner taught him at college. Suddenly, to the doctor's astonishment, all the landmarks disappeared from the touch of the examining finger, and simultaneously the patient gave a sigh of relief, and thanked him for his ministrations. Sims was quick to interpret the phenomenon. The inverted position had caused the abdominal and pelvic organs to drop back, accompanied by an inrush of air under atmospheric pressure, enormously dilating the vagina. Neglecting his other work for the day, and fired with the thought that he was on the road to success with Anarcha, he drove to a hardware store and bought a pewter spoon, got his two assistants, and hurried home to operate, realizing that to bring the field of operation into clear view was half the battle. "Introducing the bent handle of the spoon I saw everything as no man had ever seen before. The fistula was as plain as the nose on a man's face. The edges were clear and well defined, and the opening could be measured as accurately as if it had been cut out of a piece of paper." The pewter spoon was the forerunner of the now famous Sims' speculum.

Sims had just declined to receive another case of the same type as Anarcha, but he now reversed his decision and soon had three negro women installed on his premises and confidently predicted that he could cure them. Alas, failure attended each fresh attempt, and his colleagues finally came to regard him as a visionary. His practice suffered and his brother-in-law, who thought him obsessed, pleaded with him earnestly to drop the whole business before he lost the respect and patronage of the community, his health, and the prospect of an easy competency. Sims was dead to all arguments. For four years he wrestled with the task. Again and again he operated on the courageous women whom it had become his mission in life to

extricate from their wretched plight. They had sublime confidence in him. When he operated on one of them the other two, now more skillful than his regular assistants, waited on him.

The sutures would not hold whether he tried silk or the lead wire employed by Mettauer. Each performance showed improvement, but that was all. Finally, one day, he saw lying in the street a small bit of spiral wire such as was used in men's suspenders before elastic. He picked it up and took it to a jeweler who was directed to make some fine silver wire like it. This proved the noninfecting material required, and a cruel experience with the infiltration of the tissues by urine had taught him the proper procedure by which to avoid that unfortunate complication. To secure the sutures at a proper depth was one of the difficulties. At 3 o'clock one morning, while Sims lay in bed unable to sleep through much cogitating over his seemingly hopeless undertaking, he suddenly conceived the idea of passing the ends of the sutures through a perforated shot and when they were drawn tight compressing them with forceps. This turned out well and was the last important detail of the technique.

At last, in 1849, success was his, and the patients whom he had lodged and fed for four years were rewarded for their courage and trust and Sims for his sleepless nights and his days of despair. Anarcha, the first patient received for treatment, had been the subject of 30 operations before a cure was accomplished.

The report of his achievement was published in 1852, and a year later he went to New York, where his methods were generally adopted by the profession. Many sorrows, poverty, sickness, disappointment were his lot before the Woman's Hospital of New York was finally established (1855), but this, too, came at last as the reward of indefatigable effort.

Sims went abroad and was cordially received. The profession was inclined to be skeptical but provided cases on which to make practical demonstration of his methods, and uniform success soon brought him fame. His first operation was done in Dublin, a few days after landing in Europe. The next was in London, where he had the misfortune to lose his first fistula patient, the ureters having been included in the sutures. A few weeks later Sims went to Paris and operated at the Beaujon Hospital before Nélaton, Huguier, and other distinguished surgeons. His next case, at the St. Louis Hospital, was one of extreme difficulty as the fistula was very large, the fundus of the bladder having prolapsed through it, protruding outside the body. The cure of this case caused considerable excitement, and the teachers and students of medicine in Paris acclaimed him with fervor, but the next, a patient who had been operated on 17 times without benefit by a leading French surgeon, brought him still

greater renown. A visit was made to Brussels, where three vaginal fistulas were dispatched in the course of a morning. Returning to Paris, Sims undertook a case of 20 years standing in which the base of the bladder had been destroyed, exposing the mouths of the ureters, and the inverted bladder hung outside the body. Velpeau, Nélaton, Civiale, Olliffe, Larrey, and many other distinguished men attended the operation, which was performed in a room at the Hôtel Voltaire. These and one other operation of great difficulty were all successful and secured to their performer an international reputation.

Sims lived abroad, chiefly in Paris, during the period of the Civil War, attending patients of high rank, entertained by royalty, and earning wealth and honors. After a short stay in America, he again went abroad in 1870, and at the outbreak of the Franco-Prussian War organized and had charge of the Anglo-American Ambulance Corps, with Sir William McCormack as his first assistant. During the battle of Sedan he was at the head of a hospital of 400 beds.

In the course of his wonderful career Sims received decorations from France, Italy, Belgium, Spain, and Portugal. In 1865 his "Clinical Notes on Uterine Surgery" were published simultaneously in London, Paris, and Berlin. Sims is one of the few men of this country, outside of political or military life, commemorated by a public monument. The statue in Bryant Park, New York, though neither imposing nor well placed, yet serves to do him honor. His autobiography surpasses most novels in charm and interest and should be read by every physician.

Sims was followed at the Woman's Hospital, New York, by his sometime pupil and assistant, Thomas A. Emmett, of Virginia, who not only mastered all that his chief could teach him, but improved on the original technique and educated a whole generation of operators in this field.

Other prominent southerners who helped to build up the profession of gynecology were Nathan Bozeman, of Alabama; J. C. Nott, of South Carolina; T. Gaillard Thomas, of South Carolina; and Robert Battey, of Georgia.

EDITORIAL.

"BRING FORTH YOUR DEAD."

In the autumn of 1898 a volunteer medical officer who had business to transact on the ship of the senior officer present in Guantanamo Bay spent a few moments in the wardroom and was entertained with much courtesy by two lieutenants, each of whom has since attained the rank of rear admiral. The young doctor was thinking seriously of remaining in the service and led the conversation to the subject of the Medical Corps. One of his hosts remarked that the Medical Corps had more esprit de corps and harder examinations than any branch of the service, and the other corroborated these unsolicited compliments.

In the 22 years that have elapsed since this conversation the character of the examinations has materially changed; whether for good or evil need not be discussed, since the modifications were inevitable. But the matter of esprit de corps is entirely different. This depends not on the policy of a cabinet officer, bureau, or examining board, but on the entire medical personnel; and the more adverse living conditions become, the more exacting the demands of the service, the more trying the duty, the greater is the obligation to stand together, to pull together, to cultivate harmony and loyalty and a spirit of mutual trust, esteem, and helpfulness.

There is much food for reflection in the Biblical allusion to Jehoshaphat who "waxed fat and kicked." Prosperity is not always a guaranty of contentment, and the Spanish proverb in which occur the words "no amount is ever enough" is true as gospel. However discouraging some features of the present situation may be, they are common to a considerable proportion of the educated and professional classes throughout the civilized world, and the trials and privations under which we groan for the moment must be estimated in relation to what others everywhere are enduring. What we must appreciate before we can judge rightly and fairly is the enormous gain in the standing, prestige, and prerogatives of the Medical Corps during the past quarter of a century. In one respect, however, we are sadly deficient, and the deficiency can be remedied, because it depends neither on emoluments nor rank but on our personal and individual attitude to all the things that are ultimately more vital to spiritual tranquility than meat or raiment. And among these intangible things are traditions. A medical officer passing through

Washington the other day stuck his head in the door to say, "How d'ye do," and pulled a long face because a new duty assignment was going to reduce his annual pay by \$1,100, but this topic was dismissed in a moment, and he came in and talked with warmth and earnestness and at length about the "traditions of the Medical Corps." Some one had recently inquired of him if the Medical Corps of the Navy had none! One may well ask the question! The Medical Corps of the Navy has no continuous written record. Few know how or when it began, who its founders were, or what names are fit to decorate its annals when, if ever, they come to be transcribed. We hear of Walter Reed, commemorated by a hospital; there is a ship named for a paymaster of the Navy, the first Chief of Bureau of **Supplies and Accounts**; the pages of naval history are combed to find officers for whom to name destroyers, etc., but what names has the Medical Corps?

Captain James D. Gatewood, Medical Corps. U. S. Navy, has written ably and beautifully of Ambler and Longshaw and recently the Assistant Secretary of the Navy sent down for the copies of the U. S. NAVAL MEDICAL BULLETIN containing these delightful biographical sketches, but in the three years since the memorial to John M. Ambler was written no medical officer of the Navy has ever called for a reprint of it as though eager to give publicity among professional or other friends to the story of Ambler's heroic life and death. Year after year the report of the Surgeon General has been published without a reference to the members of the corps who passed away during the year it covered. We bury our dead and forget them after checking off those senior to us on the official list.

America the trivial, America the superficial, America the fickle! We do not build for the future, nor do we venerate the past. Our piers and docks are of wood. Our poorly constructed highways are forever in need of repair. Our public buildings begin to crack and crumble before they are finished. The occasional statue to a public man is insignificant or inferior as a work of art. The few great memorial buildings go up slowly, construction being constantly delayed by lack of funds. Our concern is with the living. The Hall of Fame has no effigy of a physician. The dead doctor is as little worth remembering, apparently, as the horses that perish in a Spanish bullfight.

In days of pestilence and famine the streets of medieval cities used to resound with the cry "Bring forth your dead" as the carts and tumbrils made their lugubrious way to the public burying ground. The wretched survivors drew closer together and tightened their belts. No organization can live and develop wholly on traditions, but it can derive much inspiration for wise and worthy conduct from contemplation of the immortal dead. Let us bring forth our dead,

not for the obloquy of the potter's field, but for honorable and reverent tribute in public and in private. A naval hospital might do something to correct the iconoclasm, the levity, the irreverence of young America by naming its wards Barton, Kane, Whiteside, Tryon, etc., instead of 1, 2, 3. The words *Mercy*, *Comfort*, *Solace*, and *Relief* belong to everybody. The *names* given above belong to us. Why should we forget or hide them?

But there is something more than this to be done and won. The true immortality of heroes is not achieved through commemoration on tablets of bronze or monuments of stone, but by influencing the lives of those who follow them. We make the great and sublime characters of the past eternal by thinking their thoughts and reproducing their actions in our daily walk and conversation.

In so far as any positive benefit conferred on his fellow-sufferers, Ambler's sublime self-sacrifice was of little avail. It was not wasted if the men of succeeding generations are able under different conditions to grasp the meaning of his conduct and make it the inspiration for their own.

Courage, fortitude, resolution, and patience in adversity; silence amid general complaint and upbraiding; dignity in surroundings of unseemly levity; integrity intact and honor untarnished in the general carnival of greed and money-making; modesty and quiet attention to duty while all around is display and self-glorification—these are the crying needs of the hour, the needs of the country, and the needs of the service.

There is the heroism of the battle field, of the Arctic exploration, of the tragedies of the sea, and of times of tumult and contagion, and there is the quiet heroism of so-called peace with its bloodless revolutions, moral famine, and moral pestilence. The example of our heroes invokes us to play the game.

IS EDUCATIONAL PROPHYLAXIS EFFECTIVE?

The prevention and treatment of venereal disease has been widely discussed during recent years and is now recognized as a matter of universal and vital concern. The subject naturally has two aspects, the moral and the physical, and it is unfortunate that, because the workers in this field are not equally interested in both and approach them from different standpoints, the two phases have come to be considered antagonistic. Physicians, of course, give succor regardless of the ethical standing of their patients. We do not go into the right and wrong of attempted suicide, infanticide, or abortion until we have done everything we can for the physical distress of these unfortunate cases. As physicians we are naturally concerned primarily with the prevention and cure of venereal diseases by physical means. We know the terrible toll they exact from the virtuous

as well as the sinful and how they lower the birth rate and impair the physical integrity of future generations. Since it is conceded by all that treatment should be administered early, we are really going only a small step further in giving venereal prophylactic treatment, because (considering how universally the infective agents are present in the class of persons who purvey to sinful pleasure) the great bulk of those who have just indulged in illicit intercourse may reasonably be regarded as in the stage of incubation of some form of venereal disease.

Those who wish to rely entirely on educational measures of prevention contend that the offer of physical prophylaxis condones the sin and saves the sinner from merited retribution. This can not be discussed here, but it would seem permissible and important to consider how much can be effected by a purely educational program and what its nature should be. What has been done up to the present has served to bring the whole subject to the attention of the public, correcting certain general tendencies and emphasizing the necessity of increased facilities for curative treatment. It is of course of prime importance to correct the utterly false notion, so widely prevalent among young men, that specific urethritis is a trifling ailment. Again there are many serious and unfortunate popular misconceptions about syphilis. A generation ago we used to see very virulent types, and many of the victims of this disease wanted to and some did commit suicide. To-day, on the contrary, a belief in the miraculous power of "606" and in the general scientific advances of medicine has lead people to the other extreme. The public should be taught, therefore, that syphilis is curable, but not allowed to think that the cure is either quick or easy, for that only increases the power for harm of the charlatan and quack and renders people careless and impatient in pursuing a long and tedious course of treatment.

The educational campaign, if vigorously prosecuted, must eventually help to correct many defects in social organization which indirectly favor moral laxity. Everything which beautifies and intensifies life, every added legitimate pleasure, whatever reduces lonesomeness and brightens and cheers or adds to physical vigor, reduces the temptation to wrongdoing. If young people can be taught proper values and brought up free from extravagance and excessive love of luxury and ease they will be content to begin their lives together on a modest scale; under proper restrictions early marriages promote morality. But many American girls of a certain degree of financial ease are allowed to grow up with no other idea than to have a good time. They leave off going to school and enter society much too soon. This is wrong, not because it is improper to be happy, but because such bringing up leaves them with no mental resources, nothing within the range of their own accomplishment to

make for interest and happiness at 20 or 25 when the novelty of dances and matinees has worn off. They know nothing and can do nothing, and live simply to enjoy the play of the emotions. This must surely make for hasty, ill-advised marriages and frequent divorces, and the ultimate trend is bad.

Surely there is something radically wrong with school training and home influences when the end result called a girl's education can not develop in her active young mind a real interest in some enterprise or occupation either as a means of livelihood, a shield from temptation, or an untarnishable source of entertainment in after life. How defective, too, is the education which takes no account of a girl's body or the fitting of either mind or body for wifehood and motherhood!

Recent research seems to show that a considerable number of professional prostitutes are more or less defective mentally; and as syphilis, alcoholism, and mental enfeeblement in parents bequeath those tendencies or susceptibilities which are often the true underlying cause of moral weakness, we see again the importance of public education as an indirect means of preventing venereal diseases by attacking some of their contributory causes. It is highly important to have boys understand that continence is perfectly compatible with health, indeed that it is indispensable thereto. There is value, too, in pointing out the serious consequences to health and happiness incurred by venereal disease and that illicit indulgence and infection almost always go together.

But what is the actual restraint on individual conduct which may be expected from instruction regarding the dangers of venereal disease and the dangers flowing from impurity; to what extent does the knowledge acquired strengthen resistance in the hour of temptation? If knowledge and fear of consequences could restrain desire, would we not expect medical students to be particularly free from venereal disease? They may be so now, thanks to physical prophylaxis, but they were not before the days thereof, when they had the same full knowledge of the consequences that are general property to-day. The defect of educational prophylaxis, that is, of prevention by merely imparting facts as to consequences, is due to the fact that it only teaches caution, and youth constantly throws caution to the winds in the face of temptation.

Soldiers go cheerfully into battle though well aware of the danger of being killed. Each realizes that some will come out of the ordeal alive and hopes to be in that number. He takes a chance. What counts vastly more in supporting men as they face the horrors of war is some compelling motive like self-respect, ambition, honor, love of country, a spirit of emulation, or even religious fanaticism which

operates so powerfully in the Mohammedan, for instance. One or all of these considerations enable a man to triumph over the primitive instinct of fear and the reflex activities for self-preservation.

When we expect to develop continence in men and so eliminate venereal disease by merely marshaling before them an array of statistics, telling a dramatic story, or illustrating the pathology with magic-lantern slides, do we not forget entirely that back of man's conduct are primal instincts so powerful that nature relies on them for the maintenance of the race; that these instincts have come to be regarded as culpable mainly through the evolution of a social order which prescribes conduct but does not modify instincts? I think we may safely assert that the sex instinct is infinitely stronger than the instinct of self-preservation, because nature is infinitely more concerned with the perpetuation of species than with the security of individuals, and is in fact very indifferent to the latter. Now, the phenomenon of death is present all around us. Our desire to live is weakened by the realization that death is inevitable sooner or later; the man who risks his life is only anticipating what must come finally; death is the universal counterpart of birth.

But nature does not furnish, to the human species at any rate, any parallel phenomenon to offset or reduce the sexual instinct. To dominate this there must be something infinitely stronger than the considerations which triumph over the instinct of fear and its counterpart, self-preservation; that is to say, we must go beyond nature and into the realm of the supernatural. Hence religious training would seem to offer the greatest promise in the matter under discussion—the religious instruction of the home, the Sunday school, and the church—and the power of religion will be more lasting in proportion as we get away from theological dogma, back to religion in its etymological sense as the something that binds; that which establishes a relation between the created and the Creator, or again, that which assembles everything relating to God; the obligation of the created to the Creator as exemplified by obligations to treat men as brothers and women as sisters, because we are all the children of God.

The distinction between right and wrong must have something more than mere intellectual approbation. It must penetrate the whole sentient being and be appreciated as determining man's standing before the great unlimited power of which man's very nature is but a partial expression. If we can implant religious convictions in the growing boy, even if they do not carry him beyond the seventeenth or eighteenth year without a fall, then, at least, every subsequent lapse from virtue will be the occasion of shame and remorse and of renewed struggles for self-mastery. The attempt to lead a

clean life will continue even though later contact with the world should modify categorical beliefs. The practical result is lessening of occasions for acquiring infection and conveying it to others. The sum total of the reduction of chances for infection in a career influenced by religious training is enormous compared with the course of a youth who thinks only of danger to be avoided and is encouraged to greater boldness every time he has the luck to get off scot free after misconduct.

Religion does not mean the same thing to everybody. For some, religion demands obedience to the teachings of a particular church. For others, there is the religion of trying to do what is right, and a conception of what is right is derived from countless formative influences, direct and indirect, among which the belief and practice of pious parents is preeminent. But at any rate, religion means a relation, an obligation, a duty in contradistinction to expediency.

Our country to-day is suffering from an appalling, a catastrophic, moral landslide. Matters great and small in private as in public life are decided not by the criterion of ethics but by that of personal advantage—expediency. We are no longer moved by the question of right or wrong. Everything turns on whether one "can get away with it." This shibboleth represents a more vicious and immoral attitude than the one of a few years ago, "Don't get found out," which prepared for it. The earlier maxim implied a certain sense of shame at evil doing, but now this poor restraint is swept away. Men high in authority confess unblushingly that their actions are based on the necessity of holding their offices or being re-elected. To use the old-fashioned language of our childhood, men put popularity with the people above pleasing God, whether they believe in a God in heaven or a god within themselves.

The fight against venereal disease has suffered its share from the general blight. We strive to persuade men to follow a certain line of conduct by assuring them that otherwise they will suffer disagreeable consequences. We call the failure to adhere to certain standards misconduct, though we can not show that promiscuous indulgence is contrary to nature; and yet we don't try to prevent this misconduct on the ground that it is misconduct—i. e., offense against moral law.

It is no longer fashionable to talk of sin. People scarcely admit its existence. We only try not to be detected in what our parents called sin. It suffices if we can "get away with it." We tell young men to beware of the prostitute because sickness follows intimacy with her, and sickness involves loss of pay, loss of a job, pain, and sorrow. This is the doctrine of expediency, pure and simple. It would be a more perfect doctrine if it included physical prophylaxis.

Now it takes no phenomenal wit for the youth thus intimidated to plan his gratifications without the particular risk indicated, and why should he not go to a safer field if we have argued only for "safety first?"

The moment we extend our efforts so as to protect the innocent and good from his approaches we have, if we speak to the man, to speak from the platform of duty to others, and duty to others is more than expediency, a matter of moral obligation. The selfish acts that may be harmless to him are not to be reprehended except in the light of wrong to others, and here we trench on morals. It is the moral not the mental equipment which must be preached, and until then why not provide the physical equipment? Our present educational propaganda might arouse a dormant moral sense, but it can scarcely create one. The physician, no fool though somewhat material, seems to say: "Bring up your children to love God and hate sin. Help them to desire to choose between right and wrong; create in them the power to resist evil because it is evil. When you fail we offer physical prophylaxis, but do not turn up your nose at us. Your educational prophylaxis, as long as it rests on the basis of expediency and not on conceptions of divine law, is on no higher level than our prophylaxis and it is not nearly so effective."

IN MEMORIAM.

Medical Inspector William Martin, United States Navy (retired), who died in San Francisco, Calif., April 1, 1920, was born in Louisiana, December 5, 1850, educated at Tulane University, entered the Navy as acting assistant surgeon in 1874, was discharged 1879, was appointed to the Medical Corps of the Navy by special act of Congress April 14, 1882, for meritorious service during the yellow-fever epidemic of 1874 (Pensacola) and of 1878 (New Orleans). His conduct during the epidemic of 1888 led to promotion by special act of Congress in 1890. He was retired with the rank of the next higher grade in 1893 owing to incapacity incurred in the line of duty.

Medical Director John Wolton Ross, United States Navy (retired), died of pneumonia at Lamonda Park, Calif., on February 8, 1920. Dr. Ross was born in Tennessee January 11, 1843, was appointed assistant surgeon in the Navy March 2, 1870, and served on the North Atlantic, Pacific and European Stations. In 1878 Dr. Ross attracted special attention by promptly volunteering for service in Memphis where yellow fever was raging. During his two years of arduous labor there he himself contracted the disease. The President and Senate advanced him in rank for his courageous and efficient performance of duty. Later, in Florida, and later still, in Cuba, Dr. Ross volunteered for relief work on the outbreak of yellow-fever epidemics. For two years he was instructor at the United States Naval Medical School, Washington, D. C., and served on the board of examiners for medical officers. In 1904 he was detailed for service with the Isthmian Canal Commission, but a severe malarial infection necessitated his return to the United States. He was retired January 11, 1905.

Medical Director Oliver Dwight Norton, jr., United States Navy (retired) died in California, March 20, 1920. He was born in Ohio, July 19, 1859. He was commissioned an assistant surgeon in the Navy April 22, 1885, became Medical Director September 2, 1912, and was placed on the retired list November 13, 1913. During the war with Germany Dr. Norton was called to active duty and assigned to the Navy recruiting station, Los Angeles, Calif.

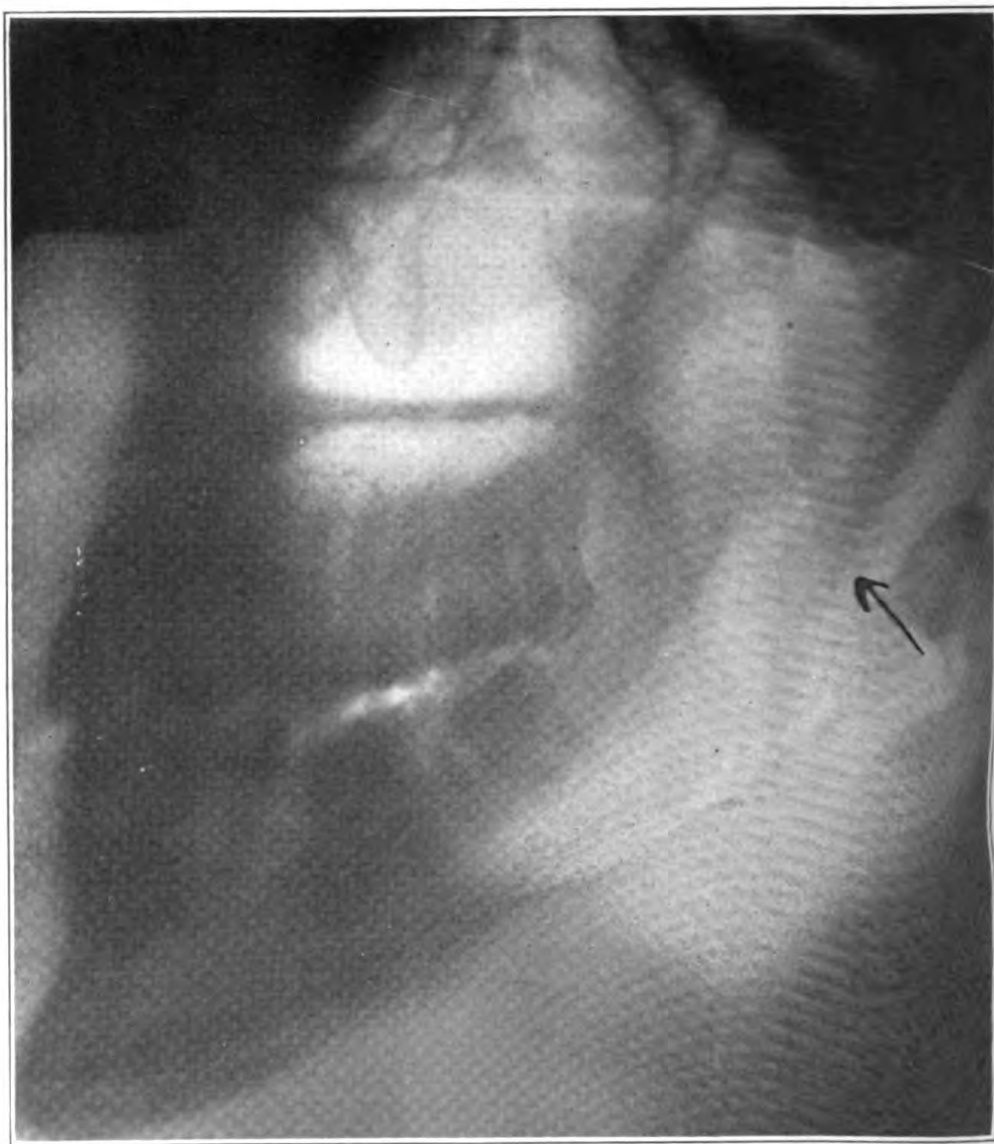
The writer recalls as if it were yesterday going over to the United States Naval Laboratory and Department of Instruction Brooklyn, to take the entrance examination for the Medical Corps one bright November morning in 1896. He was promptly rejected for myopia, and the board proceeded dispassionately to more important business. The poor candidate was forlornly going down the hall when Dr. Norton, who was on duty in the Department of Instruction, happened along and asked what was wrong. He suggested waiting a few weeks, resting my eyes, and trying again. This was impossible because such a delay would have taken me over the age limit fixed by existing law, so he gave me a cordial handshake, a bright smile, and a word of friendly sympathy and sent me away in better spirits. This courtesy from a perfect stranger had a good deal to do with my coming into the service later when the age limit was raised and the visual requirements lowered.

I had been in the service some years when I was taken sick aboard a small gunboat in the Philippines. The malady was trifling, but was lonesome, depressed, and very uncomfortable. Dr. Norton came over at once when requested, gave me such mild treatment as the case required, and, what was vastly more needed, put me in an entirely different frame of mind by his extreme courtesy and kindness.

He had served with the Marines during the Boxer rebellion and collected a varied assortment of Mauser rifles, carbines, etc. Having never been south, he was anxious to acquire a few samples of Mexican weapons, and we agreed to trade. I have always remembered how anxious Dr. Norton was to trade fair, to satisfy himself that his greatly his junior, got plenty of what I wanted in exchange for what he wanted.

These are all trifles, but I often think of Dr. Norton in connection with the motto which Bishop Wykeham gave to the great public school he founded¹ at Winchester, "Manners maketh the man," and wish that America had more Winchester men.

¹ The College of Saint Mary dates from 1387 A. D. and ranks with Eton, Rugby, Harrow.



Case of Locke. Fracture of condyloid process, lower jaw. Teeth wired for 27 days.

391

CLINICAL NOTES.

NINE CASES OF FRACTURED JAW TREATED BY INTERDENTAL LIGATION.

By W. F. MURDY, Lieutenant, Dental Corps, United States Navy.

During the past year there were nine cases of fractured jaw, seven of the mandible and two of the superior maxilla, treated at the dental office of the Naval Hospital, Norfolk, Va. These do not include five cases from overseas, whose fractures were received in action, and who had received first treatment in France, and three cases readmitted on January 12, 1920, from the United States Naval Hospital, Naval Operating Base, Hampton Roads, Va. The latter cases were received with teeth ligated and the fractured parts in good position. Those from France had loss of bone structure, and soft tissues, the result of being struck by shrapnel or bullets or of subsequent necrosis. Metal splints were employed, and were in position on those cases received from the battle front. Dental prosthetic appliances were used to restore lost tissue in these cases. One patient had lost the alveolar process, and part of the palatal process of the superior maxilla from the lateral incisor to the third molar, and had an opening measuring about 5 millimeters leading into the antrum of Highmore. This aperture was closed by an extension on a vulcanite plate.

Of the mandibular fractures, five were in the body of the bone, ranging from the symphysis menti to the angle; one at the condyloid process, which is a rare location; and one of the alveolar process extending from the apex of the right central incisor and passing posteriorly to the second bicuspid, and then taking an upward course to the alveolar border. Three were compound fractures, three simple fractures, and one multiple compound fracture.

The fractures in the maxilla were compound and involved the alveolar process and part of the palatal process in the region of the anterior teeth. The causes of these fractures were:

1. Accidental blow from a baseball bat while playing baseball.
2. Blow from companion while on liberty, and during quarrel over possession of liquor.
3. Fall down ladder aboard ship.
4. Blow on the jaw inflicted by drunken companion.
5. A blow on the chin during a fist fight ashore.
6. Blow on the jaw during a fight while drunk.
7. Striking the jaw on a steel plate due to slipping while ship was rolling.
8. Explosion of oxygen gas generator, the gauge striking the face.
9. Accidental blow from a bat while playing baseball.

It is noted that one-third of these cases had origin in overindulgence in intoxicating liquors. If a large percentage of frac-

tured jaws were received during drunken brawls in the past, one can expect in the future, with prohibition, a lessened number of sick days from this cause.

The method of treatment in eight of these cases consisted of interdental ligation, one of the oldest methods in use for the fixation of fragments in fracture of the jaw. It is said that Hippocrates used this method 2,500 years ago. Brass wire, 23 gauge (B.&S.) (obtainable from the naval medical supply depots on M & S Form B (dental) or M & S Form 4) was passed around the individual teeth of both jaws, and twisted on itself. The twisted wires from the upper jaw were united with the twisted wires from the lower jaw, usually with a wire on a tooth that was anterior or posterior to its fellow in the lower jaw. This caused a crisscrossing of wires, which prevented any anterior posterior movement of the fragments. Gutta-percha was placed on free ends of wires to prevent laceration of mucous membrane of cheeks.

Some dentists wire only a few teeth on each side of the fracture, but experience has shown that the greater the number of wires, the stronger will be the fixation. Wires break during the process of repair. As new wires can not be placed after the jaws are wired in occlusion, the necessity for more wires than are needed in the beginning of treatment is seen. If the case permitted, passing of ligatures around the third molar and cuspids was avoided. In these molars it was impracticable on account of location, and in the cuspids on account of contour of neck of tooth, the wires invariably slipping down after being on a short time.

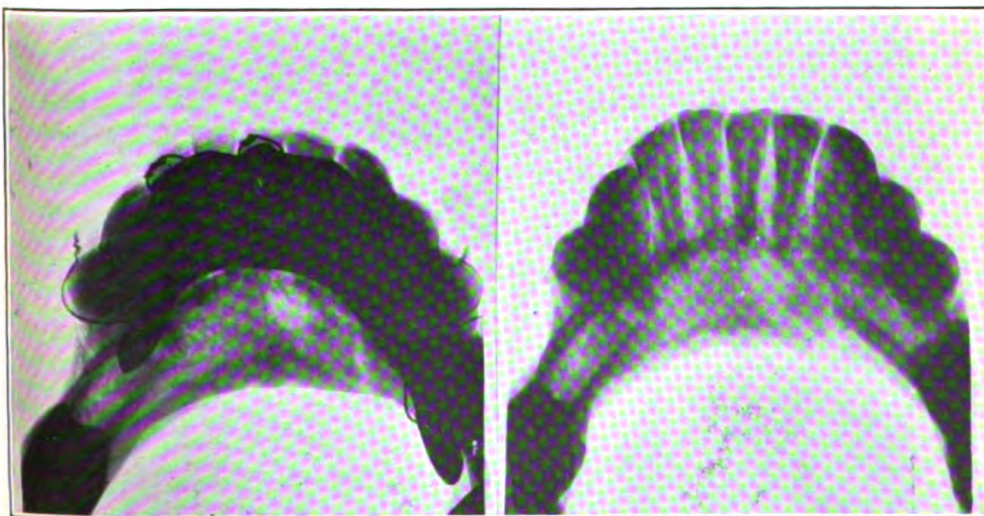
In one of these cases, a simple fracture of the mandible occurring near the symphysis, the ligatures were removed in about one week. Impression and model of the lower teeth taken, and a cast tin dental splint was made and inserted in place.

The patient's occlusion of teeth as shown by abraded places on cusps or biting edges here and there, together with the knowledge obtained from the patient, after wires were in place, as to whether his teeth were in the same position as before the injury, radiograph of fracture after ligation, and the knowledge of a typical normal occlusion of teeth were the indications that the ends of the fractured bone were in correct apposition.

The wires were removed in about 30 days and only after a radiograph showed new bone or callous formation, and there was non-mobility of fractured ends. Gentle massage in the region of the temporo-mandibular joint was practised daily. No anesthetic was employed in reduction of fractures. A slow and gradual tightening of ligatures brought the fractured ends of bone to proper apposition and the teeth to the patient's occlusion.

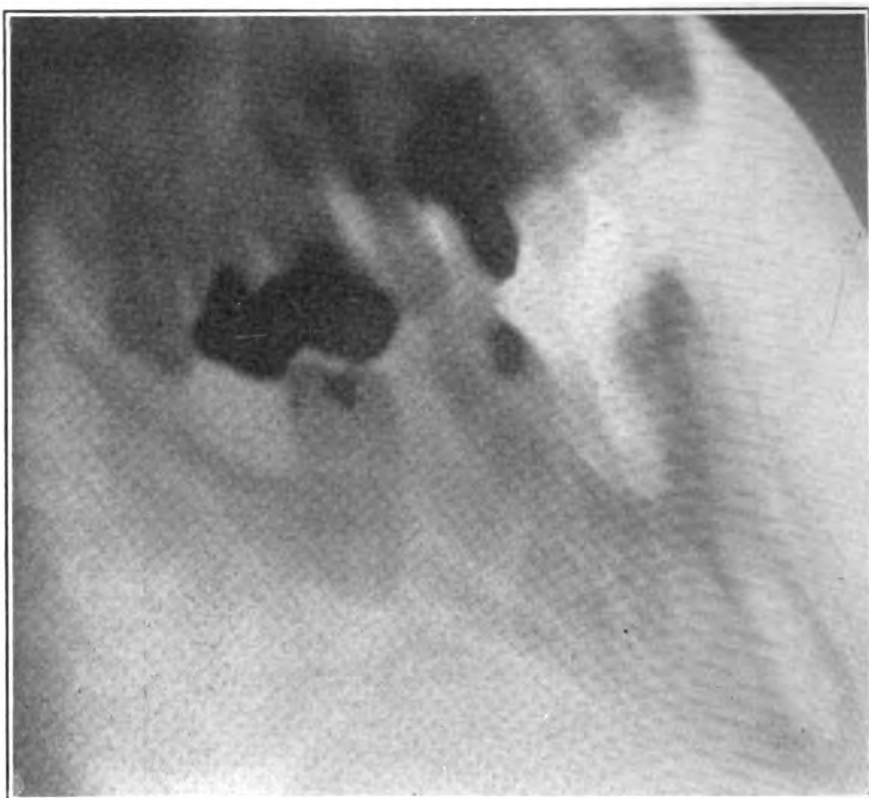


Case of Fitzgerald. (1) Plaster models of teeth. Result of wiring above. Condition at time of injury below. (Compound fracture near symphysis.)

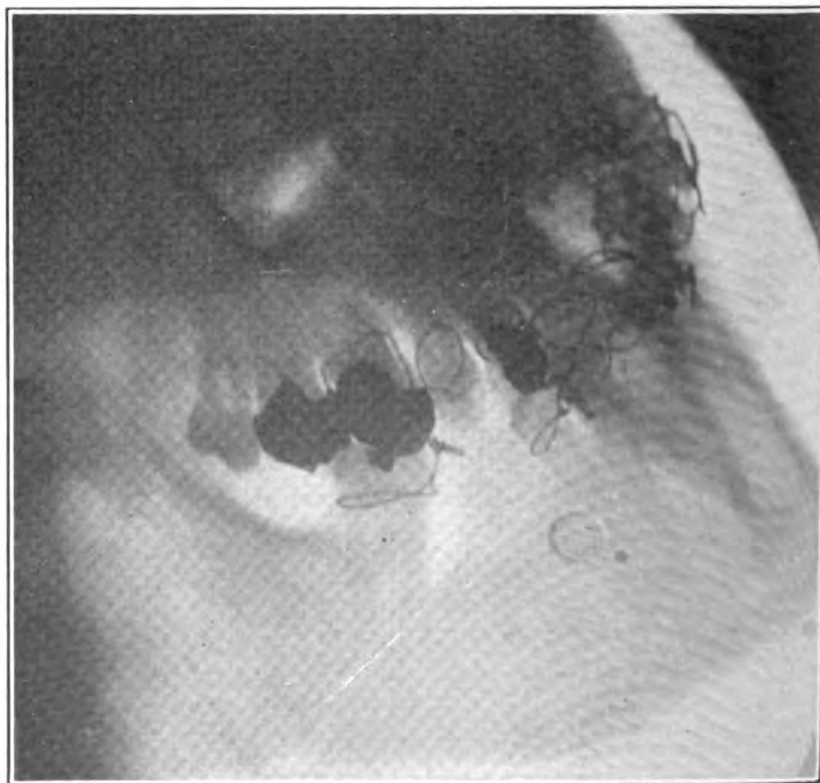


Case of Fitzgerald. (2) Wiring followed by metal lingual splint. Result.

392-1



Case of Olsen. (1) Fracture and typical displacement where line of break runs between anterior border of ramus and cuspid teeth.



Case of Olsen. (2) Wires in position.

392-2

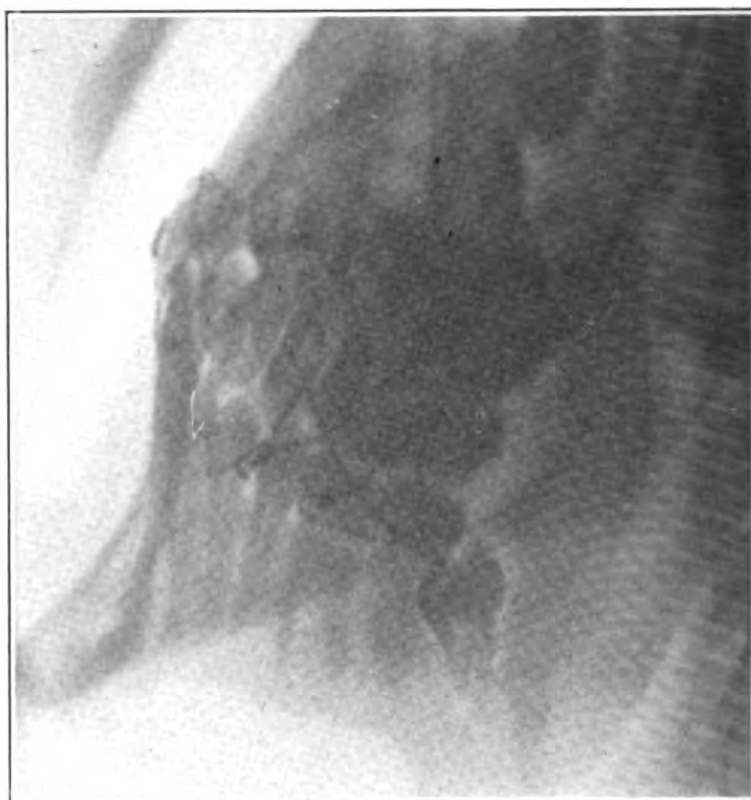


Case of Olsen. (3) Condition after wiring 30 days.

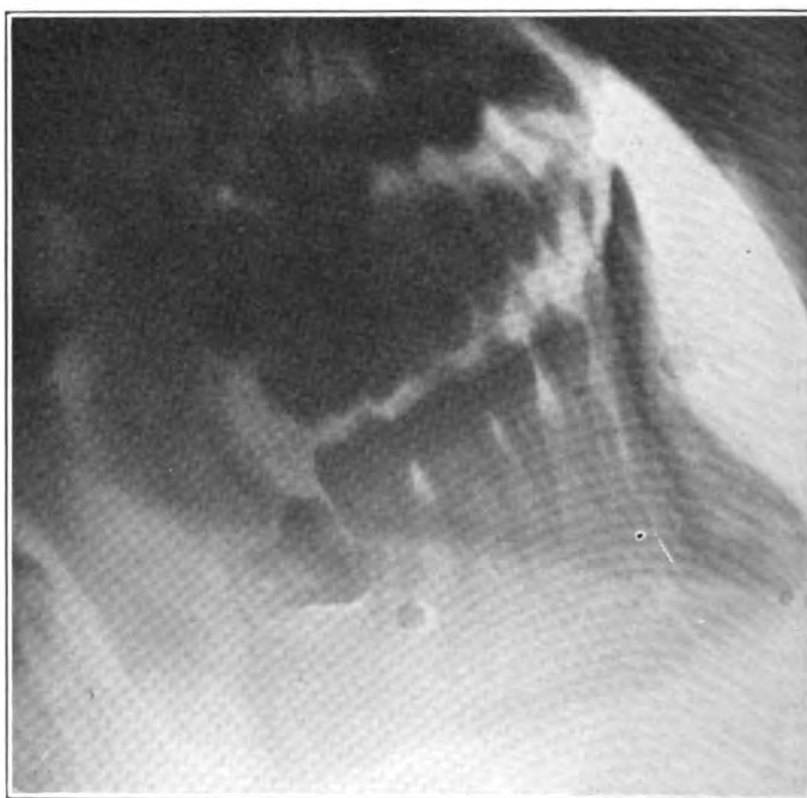


Case of Burnett. Incomplete fracture of mandible at second lower left molar.
Injury, May 1; wiring, May 6; ligatures removed, May 29, 1919.

392-3



Case of Wilborne. (1) Fracture in region of unerupted third molar, left side. Teeth wired.



Case of Wilborne. (2) Fracture in region of right cuspid.

392-4

In the case of the fracture extending along the alveolar process from the apices of the roots of the right central incisor to the left first molar, the patient reported 10 days after the injury occurred with the wound badly infected. Conductive or block anesthesia of the inferior-dental and buccinator nerves under novocain was obtained, and the teeth and a portion of the infected bone were removed, the necrosed area being curetted.

One patient had an attack of vomiting after having had the ligatures in place for about two weeks. He was rushed to the office, and upon arrival the vomiting had ceased but there was a collection of food behind his teeth. The first thought was to cut the wires, but on second thought the mouth was syringed with water, the undigested food passing out through an opening caused by two missing lower-molars.

It was believed at the time that he had been drinking too much milk and that a curd had formed in his stomach, so this article of his diet was lessened and more soups substituted. It was learned shortly after his discharge to duty that he was seen to place pieces of meat into the opening caused by the above-mentioned missing teeth and swallow them. Openings in a denture caused by missing teeth are an advantage to a patient taking liquid diet, whose teeth are ligated or in an interdental splint, but with some persons, as in this case, it serves as a means for taking food which it is impossible for them to masticate. No doubt advocates of extraction of one or two teeth so that patients can take food more easily will be interested in this case.

No difficulty in taking liquid diet has been noted in patients with their teeth ligated. Feeding with a rubber tube passing through the space behind the third molar was not resorted to.

Infection followed in two of the cases of compound fracture. Potassium permanganate 1 to 10,000 was used as a mouth wash every three hours. All cases made a good recovery, and the restoration of the patients' occlusion of teeth was very gratifying.

The disadvantage of ligation of teeth and closed-bite splints in treatment of fractured jaw is the danger of choking should the patient have an attack of vomiting or severe coughing. Should this happen, the wires can easily be cut with a pair of scissors. A nurse or hospital corpsman should be instructed to keep on the watch for this danger.

This method of treating ordinary cases of fractured jaw has its place in a naval-military service. There is nothing complex about the procedure. In the field or on board ship it is impracticable to construct metal or vulcanite dental splints. The ligature wire issued on Form B (dental) would be a valuable addition to the general operating case for use by medical officers in fractures of this kind.

A TEMPORARY STOPPING AND SEDATIVE COMBINED.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

A simple and extremely effective temporary stopping having distinct sedative action may be made by mixing chemically pure zinc oxide powder with sufficient eugenol to make a paste. Take a pledget of cotton, approximately the size of the cavity, and incorporate with its fibers by thoroughly triturating on a cement slab the eugenol and zinc oxide paste. Dry the cavity and insert the cotton impregnated with this paste, forcing it in gently so as to pack evenly. Then remove excess of paste, if any, with a cotton pledget.

This compound is a remarkable sedative in cases of sensitive cavities, and will withstand the stress of mastication for several weeks, depending, of course, on the factors in the individual case. It can easily be removed with an explorer, and remains sweet and clean for a considerable period. It hardens shortly after becoming wet with saliva and the taste, while penetrating, is not unpleasant.

This preparation is indicated particularly in cases in which a cavity in a vital tooth is prepared or partially prepared and is to be filled at another sitting, and it is valuable in those in which sensitiveness in cavity preparation is encountered. Reports from various sources and personal experience confirm the usefulness of the method. The writer does not know who has the distinction of originating it.

ASCARIASIS AND APPENDICITIS; REPORT OF A CASE.

By E. G. HARKANSSON, Lieutenant Commander, Medical Corps, United States Navy.¹

The case, a mulatto girl, born June 3, 1915, came first under observation as an out-patient on July 28, 1919, on account of vomiting after eating. A physical examination at this time revealed no signs of acute or chronic illness, but the feces contained myriads of ova of *Ascaris lumbricoides*. Santonin was administered and instructions given to bring the child back in a week for further treatment. She was not seen, however, until almost a month later, August 24, when a physician was called to her home. The child had been acutely ill for 12 hours, having had constant severe pain in the abdomen, especially around the navel. She had vomited once, a short time before the physician arrived. She was found sitting up in the bed with her hands on the abdomen crying vigorously. The abdomen was distended, rigid, and tender. The tenderness was most acute in the right lower quadrant, which area was dull on percussion and gave fluctuation as if containing fluid under considerable tension. Heart and lungs were negative and the pulse indicated no impending collapse.

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The child was admitted to the hospital and operated on (18 hours after onset). The omentum enveloped a mass in the appendiceal region and while teasing through it a gush of fluid feces escaped. When the rent was enlarged four living ascarides crawled out. The ileum was packed throughout with masses of worms. The jejunum was similarly filled, to its full capacity, as it seemed, with wriggling parasites. The whole appendix was in an advanced stage of inflammation. It was perforated at the base by a gangrenous area and through this ascarides kept crawling out. When the appendix had been removed a thorough search for ascarides in the peritoneal cavity was made and 31 were found and removed. Enterotomy for removal of the worms in the small intestine was considered but not undertaken.

The child died eight hours after the operation. An hour before death she vomited up nine ascarides and passed five by anus; two worms had found their way out along the drain.

Autopsy performed nine hours after death revealed only the surgical pathology above described. Sixteen more ascarides, however, were found in the peritoneal cavity, all between the liver and the diaphragm. The small and large intestines contained 161 adult worms. The total number of ascarides recovered from the child was thus 224.

AN UNUSUAL CASE OF MALARIAL CRESCENTS.

By W. H. MICHAEL, Lieutenant Commander, Medical Corps, United States Navy.

It has been the general impression that the finding of crescents indicates that a malaria case is a chronic one. The case history that follows certainly helps to refute such an idea and to establish the fact that crescents may be very quickly formed under certain conditions. It is probable that the irregular and inefficient administration of quinine in this case brought about the formation of crescents as a defense reaction on the part of the malaria parasites in much the same way that the spore-forming bacteria develop spores in unfavorable culture media. This case showed a heavy infection of crescents within one month from the first appearance of symptoms of malaria and within two months of possible exposure to the disease.

K. E. S., private, United States Marine Corps, from central New York, underwent his period of training at Parris Island, S. C., from September 5 to December 3, 1919. He arrived in San Pedro de Macoris, Dominican Republic, on December 8, 1919, and was sent to Ramon Santana, Dominican Republic, where he remained until January 1, 1920, when he moved to Guayabo Dulce, Dominican Republic.

He felt well until January 5, 1920, when he had "chills and stomach trouble." He took some quinine, about eight 8-grain capsules, at irregular periods during the eight days he spent in bed at that time.

He got up on January 12 and went back to bed on January 15, with the same symptoms, and was in bed three days, during which time he took six of the same kind of capsules.

He went to bed again about January 22 and took about 12 of the same capsules at irregular periods up to his admission to the Field Hospital, San Pedro de Macoris, Dominican Republic, on January 31, 1920.

On admission his blood was examined and crescents were found at about the rate of one in four fields of the oil immersion lens. As many as three were found in some fields.

It is evident that this man acquired his malaria in the Dominican Republic and that he developed a heavy infection of the sexual forms of *æstivo-autumnal* malaria during, if not actually because of, inefficient quinine treatment.

A CASE OF POISONING BY JELLYFISH.

By A. H. ALLEN, Commander, Medical Corps, United States Navy.

The following case of poisoning by the sting of jellyfish is thought to be of interest on account of the rarity of such severe symptoms, the fact that it occurred in northern waters instead of the Tropics, and particularly on account of the lack of literature on the subject.

The only previous report¹ of severe cases seems to be that of Commander E. H. H. Old, Medical Corps, United States Navy, made in 1908, in which he gives an account of nine cases of jellyfish poisoning, one of them fatal, which occurred in the Philippines.

The patient, while in swimming in the York River, from a regular swimming dock at Base No. 2, was stung by three jellyfish of the white variety. The tentacles had to be pulled off his chest, arms, and back. He immediately came out of the water complaining of intense burning and itching. Within 15 minutes an intense coryza was present. The eyes were streaming, the nose running, and there was frequent sneezing. This was followed by an intense erythema over the entire trunk and neck. No hysterical symptoms were present, but the patient was slightly nauseated. The erythema was rapidly followed by the stage described by Old as "weeping" eczema. This was intense, soaking through bandages, pajamas, and bath robe.

At first sodium bicarbonate paste was applied, but the relief was only temporary. Then camphophenique was tried. This seemed to

¹ Philippine Jour. Sc., Vol. III, No. 4, sec. B, Med. Sc.

give more relief than the soda. After 10 hours of constant application with no real relief from the intolerable burning and itching, a quarter of a grain of morphine sulphate was administered hypodermically. Within 10 minutes all pain disappeared and the patient fell asleep. Old also makes a point, in his account, of the prompt action of morphine in these cases.

On awaking, the patient was found to have almost complete aphonia, not being able to speak above a whisper. The nose and eyes were clear. The chest, back, and arms showed the usual welts and papules, with numerous petechial hemorrhages in addition.

The larynx was examined on board the U. S. S. *Solace* and hemorrhages were seen in the right vocal cord.

The laryngeal affection persisted for over four weeks. Repeated examinations showed the right cord to be violently inflamed, with a suggestion of a membrane upon it. The aphonia continued despite topical applications of zinc sulphate and the inhalation of an oily eucalyptol spray for 18 days, when the voice slowly began to return to normal. Two laryngologists, who examined the case, said that in the absence of such a definite cause a diagnosis of tubercular laryngitis would be made upon the appearance of the cord.

At the present writing all signs have disappeared and patient is perfectly well. The involvement of the vocal cord is suggestive of anaphylaxis.

TRAUMATIC RUPTURE OF A KIDNEY CONTAINING A STONE IN ITS PELVIS.

By F. H. BOWMAN, Lieutenant Commander, Medical Corps, United States Navy.

E. W., private, United States Coast Artillery, was admitted to the U. S. Naval Hospital, Key West, Fla., March 5, 1920, with the following history:

On February 5, 1920, one month previously, he had been kicked in the right lumbar region by a comrade. He was taken to the sick bay of the Army barracks and put to bed, suffering from very severe pains across the lumbar region, pains so severe that it required large doses of morphine to keep him quiet. Examination at that time showed no fracture of the ribs, and no apparent injury to the spine. There was, however, marked tenderness over the right kidney and in the upper right quadrant of the abdomen, with some symptoms of shock. So marked was the tenderness and rigidity that palpation revealed nothing. Several hours afterwards it was noticed that his urine was bloody and somewhat reduced in amount.

A diagnosis of ruptured kidney was made and expectant treatment begun. No sign of peritonitis developed, and the blood in the urine decreased and finally in about one week disappeared alto-

gether. He still complained of pain in the right side, particularly when he breathed or moved about in bed. The right side of the abdomen remained very tender to the touch, and it was still impossible to determine anything by palpation. Three days after the disappearance of blood he began again to suffer intense pains of a colicky nature over the right kidney and radiating down along the right ureter. At the same time blood again appeared in the urine. The patient passed blood again for three or four days. He had several of these attacks of pain and hematuria, and his record showed that a large amount of blood was lost at each attack. He was seen by the writer on March 5. At that time he was passing almost pure blood and was quite anemic and weak. The red count was 2,700,000; hemoglobin, 75 per cent. Removal to the naval hospital, Key West, was advised. He was cystoscoped at once and the good kidney seemed to be functioning satisfactorily. An attempt was made to stop the bleeding by morphine, ice pack, and calcium lactate. Two injections of 30 cubic centimeters of horse serum were administered 12 hours apart. The hematuria stopped. On the evening of March 7, the third day after admission, he began to bleed again and very profusely. A blood count the following morning showed 2,200,000 red cells. Operation was indicated, and under ether anesthesia a right lumbar incision was made down to the capsule of the kidney. The fatty capsule was opened and the kidney explored. It was found to be distended to about four times its normal size, and two areas of fluctuation were made out. The upper pole appeared black from hemorrhagic discoloration, and the rest of the kidney consisted of various-sized necrotic areas separated by healthy tissue. A large freely movable stone was felt in the pelvis. No break in the capsule could be determined. It was clear that very little normal tissue remained and that the only course to pursue was to remove the kidney. To do this it was necessary to enlarge the incision to within $1\frac{1}{2}$ inches of the anterior superior spine and to squeeze out some of the blood which distended the pelvis of the organ. The kidney was then removed in the usual manner, doubly ligating the vessels and ureter. The wound was closed with a small cigarette drain.

Examination of the kidney showed the fluctuating masses to be hematomas, which had formed in the cortical area and extended so that one included the upper pole and the other the anterior half of the kidney. The pelvis was likewise greatly distended, but not connected by any large opening with the two cavities above mentioned. The remainder of the kidney was largely made up of extensive necrotic areas, so that only three or four small areas of normal tissue remained. Weight, 150 grams.

The patient made a good recovery. In the first 24 hours he passed 650 cubic centimeters of urine; the second day 1,500 cubic centimeters. He was out of bed on the fourteenth day, and the red count at that time was 3,400,000.

This case is reported because of the evident relation of the stone in the pelvis to the seriousness of the injury. In the first place, it is highly probable that had it not been there a contusion only would have resulted. The blow was not a particularly violent one, and the capsule was intact. The rough stone had evidently torn through into the kidney substance, lacerating the tissues and injuring the larger blood vessels. In the second place, it no doubt acted as a ball valve, damming back the blood and urine and causing the enormous distention and destruction of the organ as noted. The history of the appearance and disappearance of blood tends to bear this out.

REPORT OF A CASE OF ERYTHEMA MULTIFORME.

By M. F. CZUBAK, Lieutenant, Medical Corps, United States Navy.

J. T. N., seaman, second class, age 20 years, reported at sick call March 1, 1920, presenting what appeared to be a typical herpes labialis. This was treated with camphor-menthol ointment.

Two days later he again reported, this time presenting an eruption on the dorsum of both hands, fingers, and wrists. Local applications of an ointment consisting of ichthyol, ammoniated mercury, and phenol were made and the hands bandaged. This was a typical herpes iris as described in the textbooks, and improved daily under the treatment mentioned.

On March 8, 1920, the patient again appeared at sick call, now presenting an extensive herpes iris on both thighs and legs and on the lower abdomen. For the first time in the course of his illness he developed a slight rise in temperature. A photograph had been taken of the hands and lips four days after the primary herpes labialis. Arrangements were made to photograph the thighs and legs on the morning following the first appearance of the lesions on the lower limbs, but by the following morning the eruption had largely disappeared.

In the same manner herpes iris would show in one region of his body one day only to disappear overnight and to reappear in another region the following day. This evanescent, fleeting eruption traversed the entire body during the remaining five days and then subsided abruptly. The patient was discharged to duty on March 14, 1920, 13 days after the original labial manifestation.

The ointment prescribed was efficacious and was enhanced by the internal administration of iron, quinine, arsenic, and strychnine. No cause could be adduced, and the "spoiled food theory" could not be substantiated. There was a previous history of recurrent attacks of herpes labialis without sequelæ. Family and present history were negative. The physical examination showed a well-nourished young male adult, of rather phlegmatic constitution, with no evidence of physical or mental impairment.

PROGRESS IN MEDICAL SCIENCES.

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GENERAL MEDICINE.

COOLEY, E. L. Static back trouble. Illinois Med. Jour., Vol. XXXVII, No. 3, March, 1920, page 195.

Under the above caption may be included all those back conditions that are not of infectious origin, secondary to derangement of special organs, or due to some intercurrent disease. By the term "static" is meant any change in the anatomical and mechanical relation which the various parts concerned bear to each other.

There is a recognized group of conditions wherein static disturbance is evidently the chief pathognomonic factor. A static condition may result from an overstrain of muscles and ligaments in any part of the body, but only a small proportion of these cases owe their origin to a strain. Other factors must operate at the same time to produce a true static disturbance. The peculiar anatomical arrangement of the spine and its diverse functions make it liable to static disturbances. Slight traumatic influences, insufficient in themselves to cause any serious trouble, become potent factors for evil when taken collectively or persisted in. Incorrect walking or sitting; improper working attitudes; overworking any special muscle groups; pronated and everted feet; most modern corsets; narrow, high-heeled shoes; any sudden change from sedentary to active life act in this way. The element of time is a necessary adjunct in the etiology. Without it few of the above factors would cause any serious menace.

In making a diagnosis the following points must always be considered:

1. Whether the condition is acute or chronic, periodical, or constant. Acute conditions can be eliminated. Periodicity may occur in the earlier stages, but this depends on certain factors such as exercise, menstrual periods, or temperature changes. Static back trouble is usually slow and insidious in approach, not incapacitating at first, nor very uncomfortable. The significant fact is that

it persists in spite of routine curative measures. When the patient is relaxed or at rest the pain and discomfort are lessened or relieved, only to return on the resumption of activity.

2. The presence of painful pressure points. Such points may or may not be present and are not pathognomonic. Their occurrence is due to muscle strain, and they usually follow the course of some muscle or nerve, the longissimus or multifidus spinæ and the lower intercostal and gluteal nerves. If these points are deep-seated, the periosteum or deep ligaments are involved.

3. The effect of movement upon the character of the pain. In many cases the pain stops or becomes very much lessened when the body is at rest. If the fault be in the working attitude, in walking, standing, or sitting, a change to the normal position often has the same effect. In any case the condition is aggravated by the ordinary work-a-day affairs, for here the causes that generally produce the trouble are constantly operative.

4. The presence of some specific organism. The tubercle bacillus, pyorrhea, syphilis, gonorrhea, and others should not be overlooked. The acute infections, especially in childhood, are sometimes responsible for subacute or chronic back troubles.

5. Involvement of special organs, as the stomach, liver bronchial and mesenteric glands. Here the condition is usually acute in onset or secondary to other conditions for which the patient seeks medical aid. In enlarged mesenteric glands, as in certain diseases and injuries of the kidneys, the pain may be localized in the dorso-lumbar region.

6. Lumbago and the neurasthenic spine. These two conditions are frequently mistaken for static-back trouble. The differential diagnosis should not prove difficult. Lumbago is frequently met with. It is common to both sexes, but more frequent in the male. The onset is sudden, usually in the lumbar region, pain radiates laterally and there are always pressure points. The neurasthenic spine occurs in neurotic, hysterical women (and beneficiaries of the workmen's compensation act.—L. W. J.), without pressure points. The most common location is the sacral region, the pains spreading upward and their severity depending largely on the mental state.

The whole question depends upon a careful and painstaking examination and the avoidance of routine. The X-ray offers some help, but more often is a disappointment.

The removal of the cause is the only treatment needed. If, however, the static changes are marked or of long duration, other measures must be instituted. Immobilization of the parts, supporting and corrective devices, mechano- and hydrotherapy, heat, massage, and electricity are often useful adjuncts to the treatment. Elec-

tricity has not as large a field of usefulness here as elsewhere, its effect being largely psychic. Avoid all violent and strenuous manipulation. Do not attempt to reduce any supposedly "dislocated vertebræ" or put the patient through any muscle-racking contortions. The object here is to soothe and relax the irritated and oversensitive tissues. Many will require some immobility, especially in the sacro-iliac joint strains. In severe cases rest in bed and the plaster cast are indicated. In the less severe and ambulatory cases the binder will suffice. Strapping with adhesive tape is a temporary makeshift and no more. This should consist of at least 6 layers of a width of 4 inches. (L. W. J.)

BOICE, J. M. *Résumé of the work of various observers on benzyl benzoate.* N. Y. Med. Jour. December 13, 1919.

The pharmacological experiments in connection with this drug have been carried on in this country largely by Dr. David Macht, of Baltimore, and reported in the *Journal of Pharmacology and Experimental Therapeutics* in the last three years. Dr. Boice reports the therapeutic results obtained by himself and other physicians when using this drug as a substitute or succedaneum for opium to secure an antispasmodic effect or to relax unstriated muscle fiber.

Benzyl benzoate is an ester of benzyl alcohol and benzoic acid. Either alone or in combination it is found in balsam of tolu and peru and in the volatile oils of various fragrant flowers such as hyacinth, gardenia, tuberose, etc. It may be obtained by fractional distillation of balsam of peru, or may be made synthetically in the laboratory. It is prepared on a large scale by one of the two following methods: (1) By treating benzyl chloride and anhydrous benzoic acid with phosphorus oxychloride; (2) by treating benzyl chloride and sodium benzoate with soda ash, in the presence of a catalyzer. Pure benzyl benzoate is a clear colorless liquid at ordinary temperature, is neutral to litmus and should be free from chlorine. The formula is $C_{14}H_{12}O_2$. The dose is 0.3 to 0.5 c.c. in emulsion or in capsule after being dissolved in olive oil.

The results from benzyl benzoate used as an antispasmodic for relaxing unstriated muscle fiber have been very gratifying. In dysentery painful tenesmus was relieved and the number of stools reduced. In spasm of the pylorus, in mucous colitis, in biliary colic, and dysmenorrhea very prompt relief was afforded by this drug. Its inhibitory action on uterine muscle was marked. In cases of high blood pressure the lowering effect of the drug was marked both in nephritis and in angiospastic conditions. The relief afforded by benzyl benzoate in asthma and bronchial spasm was conspicuous. (J. S. T.)

BERGER, H. C. The relation of anaphylaxis to asthma and eczema. Jour. Missouri Med. Assn., Vol. XVII, No. 3, page 109.

We are all fairly familiar with the theories of anaphylaxis. But simple as their practical application is, and brilliant as are the results we so often get by their use, few are taking advantage of this knowledge in their everyday work. Vaughan explains his theory of anaphylaxis as follows: "When a foreign protein is introduced into the blood or tissues it stimulates certain body cells to elaborate that specific ferment which will digest that specific protein. When this protein first comes in contact with the body cells, the latter are unprepared to digest the former, but this function is gradually acquired. The protein contained in the first injection is slowly digested, and no ill effects are observable. When subsequent injections of the same protein are made, the cells prepared by the first injection pour out the specific ferment more promptly, and the results are determined by the rapidity with which the digestion takes place. The poisonous group in the molecule may be set free so rapidly, and in amounts sufficient to produce symptoms, or to kill the animal."

Anaphylaxis, so far as our present knowledge carries us, is always due to the protein element in the food, and the allergy may exist to one, or to a group of proteins in a given individual. For sensitization the protein must enter the tissues before it is entirely split. When this happens sensitization results, unless successive doses are given in small enough amount at short enough intervals and over long enough periods to produce immunity.

Much of the chronic bronchitis in children is asthmatic in type. The etiology of asthma in children under the age of 12 years is usually separate from and different from that in adults. Many of these cases are due to an allergy to a food protein, because when the specific protein has been detected and the child has been immunized to it the symptoms disappear permanently. Many eczemas and possibly most eczemas in infants and children are due to an allergy to one or more food proteins. When these disorders are due to a food allergy they are not permanently amenable to other forms of treatment than immunization, and will continue either constantly or intermittently until immunization is produced either artificially or automatically.

The practical application in a given case is as follows: First take a most careful family and personal history of asthma, eczema, or known food idiosyncrasy. The next step is a differential blood count, for the eosinophile cells vary with the degree of sensitization. This seems to vary in a definite cycle, peculiar to the individual, but approximating 9 to 14 days for completion. Repeated counts roughly

determine the degree of immunization that is being effected. The next step is to detect the offending protein by one of these means.

1. The cutaneous method: This is most valuable in a very sensitive subject and is best performed on the flexor surface of the forearm. The skin is thoroughly cleaned with alcohol or ether. A small amount of the protein is rubbed into a limited area of the skin, a control being performed without the use of any protein. If positive the reaction asserts itself in 4 to 20 minutes in the form of an urticarial wheal. The edges of this area are irregular, probably due to the edema spreading along the lymph channels of the skin. The whole phenomenon disappears in one to two hours.

2. The scarification method: The skin is cleaned with alcohol or ether. With a cambric needle a small amount of the epidermis is removed by a forward and backward movement, the scratch being about an eighth of an inch long. Serum should exude, but no blood. A small amount of the powdered protein is now picked up on a moist sterile toothpick and rubbed over the scarified area. A control is rubbed in the same way with a clean toothpick. A positive reaction manifests itself as in the cutaneous method.

3. The intracutaneous method: This is the most sensitive and is not suitable for children. It consists of the intracutaneous injection of a small quantity of the protein in solution in sterile water or normal saline solution, an equal amount of the medium being injected from a syringe free from any protein as a control.

Having found the offending protein, we have two courses open to us; total and absolute abstinence permanently, and artificial immunization. The latter is usually preferable and often quite necessary, for the proteins which are the most common offenders are found in foods in daily use and rich in protein, such as eggs and milk.

To accomplish immunization we must give the protein to the patient in such amounts that the symptoms will not be aggravated. It must be given in short enough intervals not to increase sensitization, in gradually increasing dosage, and over a long enough time to produce immunity. These points vary in each individual case and require the exercise of some judgment and experience. Theoretically, we should give just a trifle less of the protein than is required to utilize the free specific ferment in the tissues. Excess will cause the elaboration of more ferment, again in excess, and will increase sensitization and exacerbation of the clinical symptoms. Practically, we have no way of determining this to so fine a degree, but approximations which will serve well in clinical work may be made at the beginning and during the course of treatment by clinical results, by cutaneous or intracutaneous inoculations of the protein in

varying dilutions, by differential blood counts, noting the eosinophilia, and by precipitin reactions. One or more of these methods should control our initial dosage and the increase in dosage as immunization progresses. The protein should be administered by the subcutaneous method in adults, in children by nasal or throat sprays of known dilutions or by oral administration, usually in capsules. Good results are obtained by both of the last methods.

Breast-fed infants suffering from eczema almost always give a reaction to egg or cow's milk protein. They are probably sensitized by the passage through the mother's breast of partially split proteins at irregular intervals and in irregular amounts. (L. W. J.)

JUMP, H. D. **Value of the high rectal enema.** Penna. Med. Jour., Vol. XXIII, No. 3, December, 1919, page 142.

Jump reminds us again that it is practically impossible to pass the rectal tube into the sigmoid flexure. Repeated experiments have shown that the tube always coils in the ampulla of the rectum.

Under Jump's observation an orderly and a nurse, both well trained, made persistent efforts to pass the rectal tube into the sigmoid. The radiograms showed in every instance the tube coiled in the rectum.

The introduction of the tube into the sigmoid in order to inject the colon is not necessary, for this may be accomplished by means of a short tube if the operation be conducted slowly and with such pressure as will not irritate the bowel.

The "high enema" should be forgotten. The proper apparatus for giving an enema is a rectal tube not more than 18 inches long with a funnel on the end. No harm can be done with this, but harm is frequently done in the effort to give a high enema. (L. W. J.)

SEGAL, J. **Treatment of typhus.** Presse Méd., February 25, 1920.

Assuming that the cerebro-spinal fluid contains more immunizing substances than the blood, and inasmuch as they are unavailable for the organisms because walled off by the meninges, the writer treated a case of typhus in the Rothschild Hospital in Jerusalem by lumbar puncture and injection of the fluid obtained.

The patient, a young lady of 28, was suddenly taken sick with headache, chills, a slight eruption, general weakness, and a temperature of 39 C. Within a week all symptoms were aggravated and the general condition was grave, as indicated by nystagmus, tremor of the tongue, torpor, insomnia, and impairment of the mental faculties. On the ninth day of the disease 8 c. c. of spinal fluid

obtained by lumbar puncture were injected under the skin of the thigh. By the evening of the tenth day the temperature dropped 1.2 C., the pulse from 130 to 120, the stupor cleared up, and there was marked general improvement. By the evening of the thirteenth day temperature was 37.2 C. and pulse 95. The treatment consisted altogether of the subcutaneous injection of 8 c. c. of spinal fluid and one of 10 c. c. given intravenously. The writer admits the insufficiency of a single favorable report. However, he had no further cases on which to test the method and offers the results for what they are worth to members of the profession who may be in a position to give the treatment more extended trial. (J. S. T.)

PECKHAM, C. F. *The Thilerium hominis*. Rhode Island Med. Jour., vol. 3, No. 3, March, 1920, page 47.

The author, in studying a series of histories of individuals suffering from various abdominal disturbances, noted that patients showed a variability of symptoms, physical and laboratory findings with a spring and fall exacerbation. He was led to suspect the presence of a chronic subtertian malarial infection in most cases.

He carefully searched the blood of these patients, but failed to find the malarial parasites. He repeatedly noted, however, that their blood showed peculiar punctate bodies to be present both within and outside of the erythrocytes. Specimens of feces from these patients, examined at the same time, demonstrated the presence of deeply staining, Gram-positive spheres, one-fifth the diameter of the red blood cell, which at first were thought to be the spores of molds or bacteria. These spheres defied all efforts at cultivation.

Upon further investigation, by direct illumination and the use of a warm stage, which enabled him to preserve a specimen of blood for several days, he noted that these punctate bodies, or so-called "blood dust," frequently presented progressive motion. He finally was able to make out a complete life cycle for these bodies. In carrying out his studies on the leukocytes it was found that the cells containing the large granules often burst and allow these granules or inclusion bodies to swim away. These bodies, which occurred as highly refractile spheres about one-fifth the size of a red blood cell, were found to be free in the blood stream for a period of about 48 to 96 hours before the Gram positive spheres were found in the feces. It was especially noted that the leukocytes containing these highly-refractive spheres appeared in the blood stream at the time of, or just previous to, the onset of the spring or fall exacerbation of mucous colitis. (G. A. G.)

MENTAL AND NERVOUS DISEASES.

MACDONALD, C. F. Should the plea of insanity as a defense to an indictment for crime be abolished? *Am. Jour. Insan.*, January, 1920.

The author's paper was suggested to him by three reports promulgated by a committee of the New York Bar Association. In discussing the commitment and discharge of the criminal insane these reports submitted the proposition that the time had come to abolish the defense of insanity on the assumption that the insane can not commit a crime. Such a suggestion is not new, having been advocated both by alienists and medico-legal jurists, but now has additional force from the implied backing of the New York Bar Association.

The author sums up the reasons for abolishing the defense of insanity for crime by declaring that the determination of the mental condition of a person accused of crime rests not with the jury which determines whether as a matter of fact a crime has been committed but with the tribunal which determines the nature and degree of punishment to be inflicted once the verdict of guilty has been agreed upon.

Vice Chancellor Eugene Stevenson, of New Jersey, is quoted as saying that the great fundamental defect of the practice of entertaining the extenuating plea of insanity lies in the assumption that in determining guilt, assigning punishment, and exercising clemency the jury, judge, and governor, respectively, manifest the divine attribute of mercy; that human justice, so called, with its many miscarriages, is merely a self-protecting institution maintained by society.

Macdonald sees in this no justification for punishing the insane, for punishment does not restrain them from crime. The lawyers are wrong in maintaining that it does. The insane do not recognize their impaired mental condition and though the paranoiac may clearly perceive the nature of crime he does not and can not apply ideas of adequate punishment to his own case. He considers himself outside of the range of the law. Ray is quoted as saying that the punishment of the insane has no more effect than would blows or threats in hushing the cries of the newborn infant.

The question of intent is often involved in determining the criminal nature of an act.

The question of intent in these cases, although intimately connected with the question of the mental condition of the accused, nevertheless is plainly distinguishable from that question. If Harry K. Thaw, when he shot Stanford White to death, supposed he was discharging a bullet into a post, then he had no intent to kill, and could not be found guilty of murder, although he might be guilty of a minor degree of homicide. His real crime would be intentionally discharging a loaded pistol in a crowded apartment with intent

to drive a bullet into a post, which act resulted in causing the death of a human being, such result being one which a reasonably prudent man must be presumed to be able to contemplate as highly probable. Now, whether the question of sanity or insanity should be left with the jury in certain cases where they are obliged to pass upon the question of criminal intent, is a question which the writer would not undertake to determine. Thaw did not intend to discharge a bullet into a post; he discharged his bullet intentionally into White's body, knowing it was White, whom he intended to kill, and he did precisely what he intended to do. The defense was that Thaw's intention was an insane intention and consequently he was not guilty of effecting the death of White.

The amount of the fine and the terms of the imprisonment are largely within the discretion of the court. Hence it logically follows that no judge can discharge his function of measuring out the penalty without taking under consideration the mental condition of the convict and the effect which enticement or provocation might have upon a man whose mind was disordered. A striking instance of the wisdom of exercising this function by the court was shown in the trial in the city of New York, a few years ago, of a young man who was convicted of murder in the first degree. The case attracted wide attention, owing to the atrocity of the crime, and after conviction the learned judge, in pronouncing sentence of death, informed the prisoner that in view of the possible existence of some form of mental disorder which might absolve him from responsibility of the crime of which he was charged, the court, of its own motion, had taken the precaution to have him carefully observed by the prison physician, and also during the entire trial by an alienist who was in attendance at the judge's request, and that he was satisfied from the reports of these physicians that there was no question as to his entire responsibility for the crime.

It is safe to say that the trial of Thaw would have occupied but a few hours if the question of his mental condition could have been excluded from the consideration of the jury and left to the determination of the court, aided by a commission of competent alienists selected by the court. A few days at most would have sufficed for this last inquiry, and the result would have been precisely what was reached after two farcical trials, with all their disgusting details, which lasted for many weeks at an enormous expense to the family of Thaw and to the State of New York. Had this method of procedure been adopted, Thaw would have been placed precisely where he was placed, namely, in the Matteawan State Hospital for Insane Criminals.

It has been suggested that this proposed change in our criminal law practice would be less objectionable if juries were never permitted to render a verdict of guilty, if they were required simply to determine if the defendant did or did not commit the act charged in the indictment, and that the indictment itself might omit all words which would brand the defendant as a criminal. The function of the jury in criminal cases would then be very like what it is in England to-day in civil cases, under the practice which has been developed largely during the last quarter of a century. The jury answers questions and finds propositions of fact oftentimes without having the slightest intimation from the court as to what the legal result will be from the different possible answers to these questions.

First. The feasibility of substituting in place of the present form of verdict, "Not guilty, by reason of insanity," the form of verdict which has obtained in England for more than three decades, "Guilty, but insane."

Second. Would it not be a more satisfactory way to deal with criminal cases, especially capital ones, in which insanity is pleaded as a defense, to keep the

question of insanity entirely out of the case during the trial and allow the jury to pass only upon the question of the guilt or innocence of the accused, irrespective of his mental condition? Then, if a conviction is had, let the court appoint a commission of competent alienists to determine the defendant's mental condition, and if he is punishable by reason of mental disease or not. If the function of the jury were restricted to a finding on the facts—that is, if the defendant committed the act as charged, and, subsequently, the question of his mental condition were determined by competent alienists appointed by the court—the finding of such a commission would be accepted by the public, both lay and medical, and there would be no danger of a miscarriage of justice.

The writer does not pretend to say if either of these methods would be feasible, but he believes that either one would be preferable to the present method of determining the mental condition of a defendant which imposes upon a jury of laymen, who, presumably, are not familiar with the phenomena of mental disease, a responsibility which they should not be called upon to assume.

(J. S. T.)

MYERSTEIN, A. *The nervousness of the Jew.* Ment. Hyg., Vol. IV, No. 1, January, 1920, page 65.

Racial disease is an expression in the individual of the trials and tribulations of his ancestry, so that to read backward becomes a fascinating possibility. The liability of the Jew to psychoneurosis is well known. This is more than a predisposition. A social heredity is as much a reality as a biological heredity, and to be distinguished therefrom. The Jew has an innate character, a peculiar character, made up of contradictions and inconsistencies. He is at once materialistic, philanthropic, idealistic, and ethical. The Jew is strongly individualistic and extraordinarily social. He is mentally active in high attainments and passively resistant in the struggle for success, a fertile soil for great success and great failure, for genius and psychoneurosis.

Social heredity contributes the controlling factors. Persecution made the Jew unsociable, exclusive. "The basis of dislike is normally unlikeness." Gradual exclusion from all activities and permanences made him a wanderer. The manual and motor side of his nature found no expression, since he was excluded from all handicraft, thus producing a physical retrogression. A sedentary wanderer and introspective, he learned many languages, saw many countries. His wealth needs, money, goods chattels, must be transportable. He soon saw his advantage and formed a dislike for craftsmanship. The Jews thus became an urban, neurasthenic, sedentary people with an antipathy to exercise or play and therefore no avenue for the discharge of nervous tension.

Added to these character-changing conditions came the clannishness and exclusion from intercourse with other peoples. Because of constant fear of massacre, of ridicule, of degradation, they acquired

a lower threshold for fear stimuli. The overintimate and close family life, characterized by purity and devotion, produced an intensified emotionality.

There are two groups into which persons may be divided, the extra-spective and the intraspective; objectively minded and subjectively minded. The objectively minded are happier. The nature of the Jew's life developed the intraspective type, leaning toward apprehensiveness and melancholia. Thus developed an intensity of character with an overeagerness and overseriousness of purpose, resulting often in great success and often in great failure.

Intermarriage, particularly in Europe, is gradually changing the Jew to the commoner type, and he will soon disappear as a character. What persecution could not do throughout the centuries toleration does in a generation. (A. H. E.)

FRIEDMAN, E. D. **The Babinski reflex.** Jour. Nerv. and Ment. Dis., February, 1920, page 146.

Babinski's toe reflex is considered to be a pathognomic sign of organic lesion of the pyramidal tract. Owing to its variability, care must be taken in eliciting the reaction. Further, a pseudo-reaction must be differentiated from the true, for, in addition to the slow dorsal flexion of the great toe, the true reaction is marked by contraction of the tensor fascia femoris of the hamstring muscles and frequently a fan-shaped spreading of the toes. Babinski's sign is usually present in the first stages of narcosis, in post epileptic states, and in uremia; absent in deep anesthesia and, though this is questioned by some, in transverse lesions of the cord.

This sign is not significant in children under 1 year of age. Its zone of elicitation is wide, as shown by the similar reactions known as Oppenheim, Chaddock, Gordon, Crafts, Bechterew-Mendel, and, in the upper extremities, the Hoffman.

The reaction is explained on the basis of recent phylogenetic development. The human cortico-spinal system, a most recent acquisition phylogenetically, is not even myelinated at birth. A lesion of the cortico-spinal system causes man to revert to the tree-climbing monkey stage, in which there is a dissociation between the great toe and the other toes and also very little opponens pollicis function. In climbing, the monkey's great toe is in extension along with the smaller toes. His hand is used in very much the same manner, thus similarly explaining the Hoffman reflex. The positive Babinski sign in epilepsy and uremia would be explained by injury (perhaps only functional if not anatomic) to the cortico-spinal system.

The Babinski phenomenon may, on the other hand, be due, in pyramidal tract disease, to a failure of the reciprocal innervation

characteristic of the human adult. This disappearance of the Babin-ski in a child on walking suggests this. In the phylogenetic advance to the upright position the extensor response becomes a flexor response. Dorsal extension of the great toe would be a handicap to the recently acquired function of walking and it therefore becomes plantar flexion.

Hypertonia of the newborn child is explained by the fact that the tonus-accelerating cerebellum is still in control; the cortico-spinal system which is tonus-inhibiting is not yet myelinated and hence does not function fully. The tracts and systems most recently acquired are most vulnerable and easily thrown out of function by disease.
(A. H. E.)

SALMON, T. W. *New problems for psychiatric research in delinquency.* Ment. Hyg., Vol. IV, No. 1, January, 1920, page 29.

Psychiatric studies have come to be regarded by many judges as a routine part of judicial investigation. The extension of this work to correctional institutions for the elimination of the mentally deficient and for the proper institutional classification and management of inmates has been begun at Sing Sing and at the United States Disciplinary Barracks at Fort Leavenworth. New York has its department of correction, Boston and Chicago have large psychiatric clinics connected with the municipal courts, which act as machinery for dealing with the problem of antisocial conduct of the individual. In the Army there has been a fairly definite special service for the purpose, and in the Navy, wherever possible, medical officers with psychiatric training are called upon to pass on the mental status of the accused. Procedures preliminary to courts-martial should include an examination into the mental state of the accused. Twenty-five per cent of all discharges in France for disability were due to nervous conditions. That terrific experiences have some effect over conduct should be considered. In the A. E. F. great numbers of individuals of subnormal intelligence and unstable make-up were exposed to extreme fatigue, shell concussion, and long-continued emotional strain. The remote effects of stress on conduct are legion.

In addition to defining the type of institution to which a subject is to be sent, there is much intrainstitutional work to be done. Our prisons contain many fixed psychopaths who, if recognized at an earlier period, might have been led into better lives. We could avoid this condition 20 years hence by a central receiving prison for psychiatric, social, and economic studies on all new prisoners. Such a system is now in vogue in New York State and at the United States Disciplinary Barracks at Fort Leavenworth. The relations between

the psychiatric clinic, courts, and prisons should be those of dispensary and hospital—continuous treatment and surveillance.

There is urgent need for uniform records and standards in examination methods. Psychiatrists, psychologists, and social investigators should hold frequent conferences. The field is large. The factor that usually determines the selection of an antisocial life from those presented to the individual is feeble-mindedness. Antisocial trends that culminate in crime have their roots in difficulties of mental adaptation. Overlooked mental conflicts exercise almost inexorable control over conduct. All delinquents are not in prison. Those outside would be benefited by the new knowledge acquired about the origin of human behavior. Any idea of prison reform should be removed. Research and aids to diagnosis are the objects in view. (A. H. E.)

CLELAND, J. B. The Australian epidemic of acute encephalomyelitis. *Jour. Nerv. and Ment. Dis.*, February, 1920, page 137.

This condition is described as an acute disease, abrupt in onset, with a mortality of 70 per cent. The clinical manifestations are those of cerebro-spinal irritation, pyrexia, convulsions, rigidity, and coma; but no paralyses are found except an occasional paralysis of a limb or eye muscles, such as remains after acute poliomyelitis. The distribution seems to be limited to the region of New South Wales and incident to the dry season of the year.

Histologically the outstanding feature of the condition is the distention of the perivenous sheaths by lymphocytic cells and islands of similar cells in the adjacent tissues. This condition was found throughout the brain and spinal cord, particularly in the corpus striatum, pons, and medulla.

The disease was transmitted by cerebral inoculation to monkeys and from these to sheep, calves, and horses. Clinical manifestations similar to those found in human cases developed with varying degrees of severity. In this particular the so-called "X" disease differs widely from acute poliomyelitis but its other characteristics are very similar, including the peculiar histological lesions.

This lesion is found also in the perivascular tissues of chronic syphilis and in the tissues surrounding old foreign bodies. The question arises, Is it due to a mild toxic agent as in syphilis, or could there be present actual bodies of the causative agent as in hydrophobia?

The scattered distribution of the disease and the irregularity of response in animal experiments are explained as being due to increased or decreased susceptibility of the central nervous system to the etiologic agent, or to a variation in the opportunities favoring pas-

sage of this agent from the naso-pharynx to the central nervous system. This susceptibility or variation, in turn, can be induced by external causes. A case of head injury, of heat exposure, of previous brain disease are cited to illustrate this. These cases all showed the lymphocytic infiltration of the perivenous sheaths. (A. H. E.)

SURGERY.

LANFORD, C. W. *Résumé of the years' work with radium.* Illinois Med. Jour Vol. XXXVII, No. 3, March, 1920, page 168.

It has been found that 80 to 100 milligrams of radium will kill cancer cells in seven hours. The depth to which the gamma or penetrating rays of radium will go through living tissue and exert a lethal action on lawless cells is approximately 5 centimeters, or $2\frac{1}{2}$ inches. From this one might infer that if 100 milligrams of radium were placed in the cervix uteri all cancer cells would be killed within a radius of $2\frac{1}{2}$ inches. But the rays diminish in intensity as they pass through tissue, until we come to a zone where the rays are so light in power that they really act as stimulants to the cancer cells instead of exerting a lethal effect. It is because of this that we employ cross-firing—that is, approaching a growth from opposite sides.

Aside from the destruction of lawless cells, radium stops bleeding; it destroys the cancer odor; it sometimes stops pain. The rays from radium act directly on the nucleus and then on the protoplasm of the lawless cells. It also causes a growth of connective tissue which shuts off the blood supply and the cell dies of inanition.

The results obtained from treatment of carcinoma of the rectum are by no means constant and uniform, and it is extremely difficult to predict what, if any, effect will follow upon radium irradiation. In some instances growths which have been regarded as inoperable have been so much improved by the action of the radium rays that they have been successfully removed and the patients have remained free from recurrence. If the growth is soft and situated in the upper half of the rectum, the results from radium irradiation are usually good. But the flat, hard growths in the lower third of the rectum do not respond at all well to the radium. Radium should be employed before operation, in operable cases, and again, in smaller doses, about 10 days after operation. The rectal mucosa is very sensitive to the rays of radium, therefore the radium tubes should be well screened with gold and at least 2 mm. of rubber. A proctitis usually results from a series of radium treatments and sometimes a stricture. The local application of radium to the rectal wall can frequently be augmented with good results by the application of X-rays over the sacrum and coccyx.

Twenty cases of carcinoma of the bladder treated by radium gave clinical cures in 4, or 20 per cent. The early recognition of papillary carcinoma is essential, and the tumor should be radically resected, if operable. Fulguration and radium have proved valueless in the cure of this type of tumor. Radium will destroy both the benign and malignant papillomas. The use of radium in the treatment of carcinoma of the prostate and seminal vesicles in many cases has resulted not only in marked symptomatic improvement but in definite reduction in the size and consistence of the tumor.

In the treatment of goiter and myelocytic leukemia with radium good results are reported. When applied to goiters the size of the growth is not always immediately affected, but the pulse rate is lessened, tachycardia disappears, and the nervous symptoms become a thing of the past.

The action of radium is almost specific in superficial cancers, epitheliomas, rodent ulcers, pigmented moles, warts, and leukoplakia. (L. W. J.)

BEAM, H. A. Recent developments in peripheral nerve surgery. Illinois Med. Jour., Vol. XXXVII, No. 3, March, 1920, page 189.

Aside from the developments in the treatment of brain injuries, perhaps the most notable advance in neuro-surgery made possible by the wealth of clinical material has been along the lines of peripheral nerve work. Twenty per cent of all war wounds involve nerve trunks, the four most commonly involved being the musculospiral, the ulnar, the median, and the popliteal branch of the great sciatic.

Four sets of syndromes are described by Tindel: The syndrome of complete interruption, the syndrome of incomplete interruption or compression, the syndrome of irritation, and the syndrome of regeneration. They are based on the following:

1. The degree of motor paralysis.
2. The degree of muscle tone.
3. The tendon reflex.
4. Mechanical irritability.
5. Muscle atrophy.
6. Electrical reactions.
7. Sensation.
8. Vasomotor or trophic disturbances.

In complete interruption the motor paralysis is complete and total. In compression the paralysis is usually incomplete but may be complete. In the neuritic type of irritation it is variable, may be marked, slight, or absent. In the neuralgic type it is absent.

The tone, which is the state of latent or constant contraction of a muscle at rest, is at first retained in complete interruption, but soon

lost. It is retained in compression and increased in nerve irritation. The tendon reflexes correspond to the motor paralysis. Atrophy begins early and is rapidly progressive in interruption, whereas in compression it is usually incomplete and slower to develop. It is slight or absent in irritation. Sensation of all types is lost at once in interruption, while in compression it is partial or there may be pain or paresthesia, as in the syndrome of irritation. Vasomotor or trophic disturbance is slight in both complete and incomplete interruption, whereas in nerve irritation it is severe. The syndrome of regeneration is of great value. During this process voluntary motion is the last symptom to reappear. Electrical reactions become normal rather late.

When section occurs, degeneration begins at once whether the nerve is immediately sutured or not; the axis cylinders segment, then disappear. The myelin swells and is absorbed. Aside from the fact that the connective tissue of the nerve is an excellent scaffolding for regenerating axis cylinders, the distal end of a cut nerve is of no further use as a nerve. Before function will return to normal the end corpuscles must be entirely regenerated.

Very fine silk is the best material for suturing nerves. Placing the sutures directly through the nerve does not interfere with the process of repair. It is unnecessary to cover the line of suture with cargile membrane, fascia lata, or any other material. Before suturing a divided nerve, unless it is a fresh injury, the ends should be freshened by cutting diagonally across them with a sharp knife. In all nerve work a dry field is absolutely essential, for this insures the minimum of scar tissue. The tourniquet should not be used. Nerve flaps, cross suturing, lateral anastomosis, and similar operations are not only usually unsuccessful but are contrary to the principles of nerve regeneration. End to end anastomosis with correct technic will produce better results.

Two methods are of value where it is necessary to bridge a gap between the ends of a nerve. These are tubulization and transplantation. Better results have been obtained by the latter method. Both homo- and heterotransplants have been used, the homotransplants being supplied by some sensory nerve from the patient himself, such as the small sciatic. In tubulization the best results have been obtained by the use of fascia lata. (L. W. J.)

ROLLESTON, H. **Dyspeptic and other referred symptoms associated with diseases of gall-bladder and appendix.** Brit. Med. Jour., March 6, 1920.

Referred symptoms are those which do not at once suggest the organ primarily involved.

For avoidance of repetition the author does not separate the symptoms of the two conditions. The diseases discussed are those of

chronic character. The symptoms caused by hepatic suppuration, empyema, and fistulæ and some forms of intestinal obstruction are omitted.

The various processes at work to give referred symptoms to other organs in disease of gall-bladder and appendix are: (1) Reflex; (2) mechanical, (3) toxic, (4) infective.

1. *Reflex*.—Irritation of appendix or gall-bladder may cause hypertonus of the stomach and spasm or failure to relax on the part of pyloric or ileo-caecal sphincter leading to gastric or intestinal stasis, hyperacidity, toxemia. Caecal stasis may result from the inhibition of peristalsis due to chronic appendicitis. Appendicitis may cause reflex increase or inhibition of micturition through irritation of a focus in the spinal cord.

Reflex epigastric pain so common in gall-bladder and appendix dyspepsia is variously explained; through peripheral distribution to abdominal parietes of sixth and seventh dorsal nerves; due to peristalsis, the pain being visceral in the pyloric end of the stomach. The superficial tenderness, it is agreed, arises from irritation of a focus in the spinal cord. Cutaneous pain from gall-bladder disease may be referred to the right shoulder and lead to treatment for "neuritis."

Stimuli generated in the appendix travel by the sympathetic to the spinal cord and by constant repetition create an irritable focus. Even when changes in the naked-eye appearances of the appendix are slight, the ganglion cells in the plexuses of Auerbach and Meissner have been found to show degeneration.

2. *Mechanical*.—Adhesions in the vicinity of the gall-bladder may embarrass the movements of the stomach, interfere with the passage of food, and even cause hour-glass contraction. Such adhesion may follow duodenal and gastric ulcer as well as cholecystitis. The stasis and toxemia may also arise from adherence of the appendix across the lower part of the ileum. Adhesion about the appendix and gall-bladder may alter the radiation of the pain. It may be referred to the left side and to the right iliac fossa.

3. *Toxic*.—Absorption of bacterial toxins from the organs under consideration may occasion a general toxemia leading to myocarditis or to damage of gastric and intestinal mucosa, resulting in hemorrhage. Toxic absorption from the inside of the organ is commoner in the case of the gall-bladder.

4. *Infective*.—Microorganisms from gall-bladder or appendix may infect the kidneys, especially the right. From the former they spread to the pancreas or cause malignant endocarditis. Thrombophlebitis of iliac veins may follow appendicitis. Finally disease of gall-bladder and appendix are closely related, the latter usually antedating the former.

It is only recently that dyspeptic symptoms have been directly traced to the two appendages of the alimentary canal here discussed, through the researches of W. J. Mayo, Moynihan, Paterson, and S. Fenwick, though John Hilton¹ apprehended that "sympathetic pains on the surface of the body" were "connected with derangements of the internal viscera." The term "surgical dyspepsia" has sprung up because the knife sometimes cures an organic lesion which resists symptomatic treatment. It would be wrong, however, to conclude that surgery always furnishes a short cut to relief and cure. M. J. Lichty found 40 per cent of 1,500 gastrointestinal cases had an organic lesion of gall bladder or appendix as proved by operation. It is the part of medicine to propagate methods of prevention by combating infection of these organs.

Cholecystitis arises from infections of appendix, intestines (particularly in typhoid fever), stomach, tonsils, and teeth. "The etiology of appendicitis has been much debated; probably several causes are at work, but the elimination of septic foci in the mouth, tonsils, and nasopharynx, the supervision of food supplies, and early attention to signs of intestinal infection and constipation would diminish the frequency of this surgical disease. In connection with the prevention of tonsillitis, it is appropriate to refer here to Dr. G. I. T. Stewart's observations showing the causal relation of bad teeth to inflammation of the tonsils.

"Gall-bladder dyspepsia is sometimes spoken of as the result of gallstones, rather to the exclusion of cholecystitis, whereas a broader view holds the field as regards appendix dyspepsia, which is ascribed to appendicitis, and not solely to the fecal concretions. The correct view is that in the main the cholecystitis causes both the symptoms and the gallstones. It is, of course, true that single cholesterin calculi may form without any antecedent inflammation of the gall-bladder, though they may subsequently favor the occurrence of cholecystitis. These calculi are much less common than those due to cholecystitis and, I believe, may form an exception to Sir Berkeley Moynihan's dictum that gallstones always cause symptoms."

The proof of the primary source of many referred symptoms lies in their disappearance after surgical treatment of gall-bladder or appendix. It has been urged that no abdominal operation be considered complete without an examination of these two organs.

The dyspeptic symptoms are commoner in women, and subject to wide variation. The exact determination of which organ is involved may be difficult. The most constant symptoms are epigastric pains and tenderness and flatulence. The pain is variable. It

¹ John Hilton (1805-1878) attendant at Guy's Hospital, author of "Rest and Pain," a classic essay. He popularized the method of opening deep-seated abscesses with forceps instead of the knife. (Editor.)

may be persistent, and often is immediately increased by the ingestion of food. It may be separated from eating by a considerable period. Heartburn is common and vomiting may follow. A prominent and suggestive feature of the pain is that modification of diet, the administration of bismuth and alkalis fail to relieve it. Neurasthenia and recurrent headache often characterize cases of long standing. The condition of the gastric juice varies. One observer reports hyperchlorhydria in 54 per cent; normal in 26 per cent; reduction in 20 per cent. Free hydrochloric acid may be absent. Appendix dyspepsia is likewise variable in its manifestations. Perhaps the active irritation of ulceration or an enterolith causes hyperchlorhydria, while mere thickening or kinking causes chronic gastritis with reduced or absent HCl. The hypersecretion may be reflex, or the result of pyloric spasm with retention of food and accumulation of HCl. Hematemesis, though rare, is a trifle commoner in appendix than in gall-bladder dyspepsia, according to the author's experience; but at the Mayo clinic the opposite was found, 5 per cent due to gall-bladder infection, 2 per cent to appendix trouble.

In the matter of diagnosis an X-ray bismuth or barium meal is useful in separating ulcer (gastric or duodenal) from appendix and gall-bladder conditions. Displacement may conceal the tenderness of the appendix when pressure is made unless the X-ray is used. Hypertonus of the stomach with undue rapidity in emptying itself is commoner in ulcer of the duodenum than in appendicitis. Adhesion around the gall-bladder make for a high position of the stomach, displacement of the pylorus to the right, and distortion of the hepatic flexure of the colon, with food retention in the stomach for six to eight hours.

Occult blood in the feces is far commoner as result of ulcer than as a referred symptom. Radiation of pain to the right iliac fossa and Bastedo's sign make for a diagnosis of appendicular disturbance. Deep tenderness to the right of the spine between seventh and eleventh ribs has been reported as pathognomonic of pericholecystic adhesions.

It is to be remembered, of course, that appendix and gall-bladder may be diseased at the same time, and removal of either organ alone will not relieve the symptoms. Furthermore gall-bladder and appendix disease sometimes simulate each other very closely. Chronic colitis with exhausting diarrhea may result from continued infection from gall-bladder or from appendicitis. Glycosuria may be due to pancreatitis secondary to infection due to gallstones. Cardiac irregularity and distress behind the sternum may accompany the dyspepsia of gall-bladder and appendix disease. Infection of these organs may also lead to pyelitis and pyelonephritis. Synovitis and arthritis may also occur.—(J. S. T.)

ROGERS, C. C. **Intracranial pressure.** Surg. Gynec. and Obstet., March, 1920.

The contents of the cranial cavity are normally just sufficient to fill it and nature provides for maintenance of a relatively constant pressure. Pathological conditions may increase or diminish pressure and a slight negative may be more distressing and obvious than considerable increase of positive pressure, and death has resulted from too rapid abstraction of spinal fluid. Changes may originate within or without the cranial cavity.

Positive pressure (increase) may be acute or chronic and the symptoms vary under these circumstances, though the degree of pressure is the same. Injuries with or without fracture constitute the most common cause of acute increase. Fracture is by no means a necessary factor in the worst cases. A compound comminuted fracture without laceration of the dura may virtually act like a decompression operation, but again there may be no relief with an intact dura. No attempt should be made to reduce a hernia cerebri by external pressure, since it is always the result of intracranial pressure. When pressure becomes normal the hernia reduces itself. Extra- or intradural hemorrhage does not kill through the loss of blood. It is the small hemorrhage, trivial in any other situation, that is serious in the brain because of the accompanying edema, due to irritation.

If carefully observed, the symptoms of acute extradural or subperiosteal hemorrhage are unmistakable. If the patient is unconscious, no subjective symptoms are obtainable, but the state of pulse, respiration, temperature, and blood pressure tell the story.

Suppose at the time of injury or hemorrhage that the patient was normal and within a certain time the pulse is 60, respiration 16, temperature 98, and blood pressure 130+, intracranial trouble should be suspected and a competent nurse must be set to observe and record developments. A second report, some six hours later, showing pulse 50, respiration 14, temperature 97, blood pressure 160+, invites surgical intervention to avert serious consequences. Should assistance be delayed until the pulse drops to 40, respiration to 10 or 12, while pressure reaches 200 the patient will not live long. Sooner or later, while spinal puncture may show high intracranial pressure, the blood pressure suddenly drops to 90 and the time for operation has passed.

Acute extradural abscesses due to infection from accessory sinuses give a different picture. In these cases pulse, temperature, respiration, and often the blood pressure are elevated, due to absorption. Symptoms of intracranial pressure will negate these changes and deceive the surgeon who fails to note that in spite of the drop in pulse, respiration, temperature, etc., the patient really seems much sicker than before. Specialists in otology have sometimes

been led astray and delayed operation, lulled by the neutralization of one set of phenomena by another.

Lumbar drainage, if carefully performed, is legitimate as a diagnostic measure, but is contraindicated as a therapeutic agent in all cases of extradural pressure increase. Intradural pressure may be subdural, subarachnoidal, intracerebral, or intraventricular. Subarachnoid pressure is to be relieved by spinal puncture and drainage. Otherwise the dura must be opened.

With subarachnoid hemorrhage a weak rapid pulse, slow irregular respiration, and temperature varying from subnormal to fever may be expected. Lumbar puncture shows blood in the spinal fluid and with unconsciousness there are movements of different groups of voluntary muscles (s. c. arm and leg). There is restlessness, the patient may cry out. The side of the lesion is sometimes wrongly diagnosed because the quiet side is assumed to be the one paralyzed, while irritation of the motor cortex by the effused blood caused contraction of the opposite arm or leg. The lesion is thus ascribed to the side of the apparent paralysis, which is never the case.

Acute intracerebral lesions in the silent area give symptoms like those of extradural lesions and are not benefited by lumbar puncture.

Acute intraventricular lesions can not be helped by lumbar drainage, because the foramen of Monro or Ilir, or both, are closed and draining off fluid from the subarachnoid space does not help.

There is just one class of cases of chronic intracranial pressure in which lumbar drainage does good, and the author has found no reference to them in the literature. He has been studying a series of individuals having in the main a normal mentality but given to petty thievery and sometimes to more serious offenses. Attempts at discipline are unproductive, being followed by repetition of misbehavior. These subjects are bright, active, apt to learn. Physical and X-ray examinations are negative and questioning does not disclose anything of value. Temperature, pulse, and respiration, etc., are normal; there are no visual disturbances or symptoms of intracranial pressure, but spinal puncture shows the fluid under a pressure of 200 to 300+ mm. of water by spinal-fluid manometer. Lumbar puncture reduces the pressure. Laboratory findings are all negative except the serological localization test of Abderhalden as done by Dr. Retinger at the Durand Hospital. By this test a 2+ or 3+ reaction of two or more glands of internal secretion is always shown. By administering the defective internal secretions return of increased pressure is generally prevented and the patients are converted into law-abiding citizens. The author believes that many juvenile delinquents should be sentenced to laboratory examination and treatment instead of being sent to the so-called reformatories. (J. S. T.)

SORESI, A. L. Protection of the skin from pus, urine, and other irritating materials by adherent rubber. Surg. Gyn. and Obst., March, 1920.

Following a paper in a previous issue of the same journal advocating disinfection of the operation area by rubber solution and ether instead of iodine, Dr. Soresi recommends the use of rubber tissue, preferably dental dam, secured to the skin by a rubber cement solution to prevent wound infection from body fluids or irritating chemicals.

Before operation the proposed line of incision is marked out and the skin is cleaned and dried with ether and painted with a solution of rubber cement dissolved in 5 parts of ether for 2 centimeters all around the contemplated cut. To the skin so prepared a piece of dental dam is applied large enough to cover the area that might be contaminated by irritating fluids. The sheet rubber must adhere closely to the edges of the cut. To insure this be sure the skin is dry before the rubber-ether cement is applied. This must be dry and clean as well. If the cement is thin use two or three coats. If the solution of ether and rubber has been allowed to stand for some time and the rubber dam has been sterilized the skin can be incised through the rubber without receiving any other preparation as with iodine, etc. When the skin needs protection for but a few days the rubber cement ether solution suffices without the rubber tissue. (J. S. T.)

FICKLEN, A. Anesthesia and analgesia by oral administration of drugs. New Orleans Med. and Surg. Jour., Vol. LXXII, No. 7, January, 1920, page 413.

The cocktails described below are of value in producing anesthesia and analgesia sufficient for dressing extensive wounds or performing minor operations:

Formula 1:

Ether	16
Liquid petrolatum	16
Peppermint water .....	.4

Formula 2:

Paraldehyd	4 to 12
Ether	16
Liquid petrolatum	16
Peppermint water .....	.4

Formula 3:

Ether	14
Liquid petrolatum	16
Peppermint water4

Formula 4:

Chloroform	2 to 4
Ether	14
Liquid petrolatum	14
Peppermint water .....	.4

Port wine or whisky may be given before and after to disguise the taste, which is said to be pungent, but not as objectionable as that of castor oil. An occasional patient vomits the cocktail. Formula 4 is said to be more satisfactory than the others.

Gwathmey is quoted as recommending the following mixture:

Chloroform	8
Ether	8
Liquid petrolatum	16 to 32
Peppermint water	.4

This may be reinforced by morphine given hypodermically if dressings are to be very painful or prolonged.

Approximately half of the patients have a short stage of excitement lasting three to five minutes; this is succeeded by deep sleep and complete relaxation. The pulse is full and bounding and ranges from 80 to 100 per minute. The sleep lasts several hours. Dressing may be started in 10 to 25 minutes after swallowing the cocktail. An occasional patient does not sleep, but does have a pronounced analgesia, with no recollection of pain.

The following formula is more powerful, and its maximum effects last from 30 to 45 minutes:

Chloroform	5
Ether	20
Liquid petrolatum	20

After an hour the patient rouses easily and analgesia persists after the end of anesthesia.

Several patients complained of the taste of the mixture, but were willing to take it again in order to get its effects. Ficklen is authority for the statement that this is the usual attitude of human beings toward intoxicants.

Ether, chloroform, and liquid petrolatum, when swallowed in the quantities stated, produce a safe general analgesia, accompanied in nearly all cases by a light anesthesia. Alarming symptoms have never been observed. Patients addicted to the use of alcohol are not suitable subjects for this method. (L. W. J.)

OCHSNER, E. H. **A new skin suture material.** Illinois Med. Jour., April, 1920.

The author reviews the various methods and materials that have been employed at different times to obtain satisfactory coaptation of skin edges.

Metal clips.—Constantly being lost; large numbers required; catch in dressings; cause pain; leave scars.

Adhesive straps.—Retain secretions; get out of place; are troublesome to apply.

Transfixion needle.—Catches in dressings; causes pain.

Subcuticular stitch.—Painful to remove; sometimes puckers the skin.

Silk.—Painful removal; causes scarring.

Silver wire.—Expensive, breaks; hard to remove; causes irritation.

Catgut.—Expensive; hard to keep sterile; knots slip easily; irritating to skin; causes stitch marks.

Horsehair.—Hard to secure properly prepared, etc.; friable; snarls easily.

Silkworm gut.—Leaves marks; irritates skin; strands too short in many cases.

Celluloid thread.—Irritating; difficult to sterilize.

The principal causes of scar formation following operations are infection, necrosis, chemical irritation, and liquefaction of suture material. The more rigid sutures, especially in delicate skins, cause local necrosis. When infection and necrosis are avoided there remains the danger of local irritation from some chemical or from absorption, i. e., from attack on the suture material by body cells. The advantage of horsehair lies in its being chitinous and therefore not the subject of attack from the cells of the body.

The ideal suture must be available in proper lengths, sterilized by simple boiling, nonabsorbable, pliable, of proper tensile strength, easily stored. At the request of the author, Prof. Louis Kahlenberg, of the University of Wisconsin, has made experiments resulting in a suture material that fills all requirements. It is named *equisetene*, to indicate a substitute for horsehair.¹ This suture is silk, treated chemically, so as to be smooth, impermeable to tissue cells, somewhat stiffer, less liable to snarl. It is put up in two sizes, one colored black, the other gray, on wooden slats, 30 feet to the slat. The finer variety is half as thick as average horsehair and has three times its tensile strength. The coarser size about corresponds to silkworm gut, but is not so stiff. The manufacturer is the Ideal Skin Suture Co., of 1316 River Street, Two Rivers, Wis. (J. S. T.)

HAMMOND, R. Roentgen-ray problems in an overseas Navy base hospital. *Am. Jour. Roent.*, February, 1919.

The author, while serving in the United States Naval Reserve Force, having been assigned the duty of establishing the Roentgen-ray laboratory at United States Navy Base Hospital, No. 4, Queens-town, Ireland, took a preliminary course at Cornell Medical College, New York, and paid particular attention to machine construction, machine wiring, and the locating of trouble without recourse to a professional electrician. Instead of a portable Roentgen-ray outfit operated by a gasoline engine as advised by the author, a $7\frac{1}{2}$ -kilowatt transformer of standard type operated on 220 volts alternating current, with complete accessory equipment, was supplied the hospital.

¹ This seems an unfortunate name, as it suggests some connection with the *equiseta*, a genus of herbaceous plants. The *equisetaceæ*, or horsetails or scouring rushes, were common in Mesozoic times. (Editor.)

Much of this equipment proved unnecessary and was never unpacked. Even if the local municipal supply had been available it would not have sufficed for the voltage requirements of the transformer. Fortunately two 15-kilowatt direct current generators of 220 volts capacity each were secured by the commanding officer of the hospital. The X-ray transformer called for 220 volts alternating current and the hospital plant supplied the same voltage, but direct current. This required the conversion of the current with great loss of energy. The hospital equipment included a rotary converter and an auto-transformer for use under such conditions. A 12-horsepower 220-volt direct current motor was purchased. With the three above-named pieces of apparatus the 220-volt direct current was transformed to the required 220-volt alternating current. The capacity of the rotary converter was so small, however, that it would not carry sufficient current to operate the transformer successfully. Consequently the work was limited to that which could have been performed by a small portable outfit.

It was necessary to build several pieces of apparatus and extensive repairs were made to the equipment as delivered. The electrical engineers and practical electricians from the repair ships stationed at this base were consulted and offered valuable suggestions and timely aid. Without their help it would have been impossible to operate the X-ray plant.

"The experience with this Roentgen-ray equipment demonstrates the importance of providing portable outfits with their own power plants for use in base hospitals, which, for all practical purposes, are to be regarded as field hospitals. With such apparatus, patients unable to be moved to the laboratory can be examined in bed. If it seems advisable to provide a transformer and other equipment such as are used in permanent hospitals, an adequate power plant should be provided with it."

HYGIENE AND SANITATION.

DUBLIN, L. I. Birth control. Soc. Hyg., January, 1920.

The author begins with a presentation of the arguments of those who agitate against birth control. He holds that the law against the giving of information regarding prevention of conception should be modified to the extent of permitting properly qualified physicians to give such advice as would in their judgment promote the interests of society. (It seems superfluous to comment here on the fact that both the qualified and unqualified physician do this and that their ideas of what benefits society vary widely.)

"Two children reaching maturity are required to replace their parents, and because of the high mortality in infancy and early

childhood and because so many people do not marry, it requires an average of nearly four children per completed family to make a new generation as large as the old. An average of one, two, or even three children per family, therefore, means a loss in population; an average of five or six children means an increase in the population."

The present birth rate in the United States is given as about that of France before the war. The birth rate has been declining for several years, but never so rapidly as now. Such groups as college professors, teachers in schools, business people of good position, and others of good stock and native-born parentage are not reproducing themselves. In a word, the citizens who will predominate in the United States, if things go on as at present, will not be the descendants of those who founded the country and gave it its original bias of character and opinion.

Hence the advocates of birth control direct their propaganda against the high birth rate of the immigrant. The author contrasts the possible disadvantages of numerous progeny among the poor with the far greater evils that result to the thousands and tens of thousands of families where there is neither "maladjustment, nor poverty, nor ignorance; where parents are by birth and tradition and capacity able to bring into the world and raise wholesome healthy offspring to do the world's work, and where there are either no children or but one or two children. It is infinitely more important that society shall be maintained and strengthened by the birth and growth of healthy, productive, and able people than that individual cases of hardship resulting from oversized families shall be alleviated, desirable as that may be."

During the last year of the war France's birth rate was about 9 per thousand, with the death rate about three times as high. For some years prior to the war France was increasingly threatened with depopulation and took active steps by commissions to study the question, by inflicting heavy penalties on those propagating the doctrine of birth control, and by planning rewards and encouragements to the heads of large families.

For the first time in its history England has recently reached a point where the death rate oversteps the birth rate. The influenza epidemic and the war are largely responsible for this. The birth rate in 1918 was 17.7 per 1,000 as compared with 23.8 per 1,000 in 1914.

There are better and more direct ways of relieving poverty than by reducing the birth rate. Develop character by education and training, develop skill, develop productiveness in industry, and stop the exploitation of man by man. Reduce poverty by checking the birth of defectives and degenerates through segregation of

parents capable of bequeathing evil heritages. Such cases are not helped by the now popular propaganda. Determine the real causes of poverty and attack them. "Healthy men always produce more wealth than they consume."

The author holds that the present propaganda will not act as a check on venereal disease. The natural consequences of certain acts are a deterrent to yielding to certain temptations, and birth control removes this deterrent. Birth control has been practiced longer and more generally in France than anywhere else, and that country has one of the highest death rates from venereal disease and associated conditions.

"The State must radically revise the education of both its boys and its girls. Our system of education must inculcate national ideals. It is not enough for education to insure efficiency; we must also develop enthusiasms for the common good. Our young men and women must be taught to realize early that we do not live for ourselves alone. The education of our women is especially faulty in this regard. Our schools and colleges, with few exceptions, direct the thoughts and energies of our girls away from normal home life. Our girls graduate from school and college often without any instruction in what will prepare them to be good mothers and wives. The old virtues of womanhood need restatement to-day; for whatever else women learn in the school, they must be educated for their place as mothers. A democratic education must make sufficient provision for this primary function.

"The State must also put a premium upon childbearing. The bearing and rearing of children is costly, both in energy and in funds, and acts as a check on personal ambition and on the enjoyment of the freedom and pleasures of social life. Success as a mother is, in the majority of cases, at the expense of achievement in other fields. The State should reward either substantially or with esteem the women who are willing to bring up families of normal size. It may be found expedient to encourage parenthood by fixing exemption from taxes—municipal, State, and Federal—on the basis of the size of the family. This principle has already been acknowledged in our Federal tax system. It needs to be largely extended and coupled with much heavier rates of taxation for the unmarried."

(J. S. T.)

UNGER, L. **Typhoid and paratyphoid in vaccinated troops.** Ill. Med. Jour., February, 1920.

The author reports 25 cases of typhoid and of paratyphoid fever in vaccinated troops which came under his observation while attached to Evacuation Hospital No. 2, Coblenz, Germany. The pa-

tients were all enlisted men of the United States Army and were admitted to the hospital between December 18, 1918, and February 10, 1919.

The patients had all received at least one course of inoculation against typhoid and paratyphoid while in the Army. This obscured the diagnosis. Of the preventive inoculations recorded, the earliest dated from April, 1917, and the latest from July, 1918. In 21 of the 25 cases the spleen was palpable. Thirteen of the cases had rose spots. Diarrhea was present in all but 4 cases. In only 2 cases did the white blood count exceed 9,000, and in 20 it was below 8,000. The diagnosis was made on clinical evidence in 16 cases, from necrological evidence in 1, from the blood in 2, and from the stools in 6. In none of the cases was there a record of previous typhoid or paratyphoid. (J. S. T.)

MEADER, F. M. *Detection of typhoid carriers.* *Mod. Med.*, vol. 2, No. 3, March, 1920.

The author, who is director of the division of communicable diseases, New York State Department of Health, begins by pointing out the advantage of attacking this problem by counties instead of by municipalities, with a view to tracing the connection between sporadic cases occurring in the various municipalities.

The starting point is the determination of the date of onset of the disease. The next step is to ascertain the possible cases or carriers of typhoid with whom the patient associated within from 14 to 21 days before he was taken sick. Researches along this line will often bring to light mild forms of typhoid fever whose real nature was not suspected and hence not reported to the authorities. A study of the blood by the Widal test is necessary in order to verify the nature of the suspected precursory cases.

The frequent difficulty of isolating the causative organism calls for great care in collecting specimens and for promptness in examining them. It is sometimes best to make the bacteriological examination at the place and avoid the delay incident to transfer, but the use of a certain amount of glycerine in the containers makes it possible to send specimens a considerable distance. It is important to rule out infection of the local water supply before taking other steps. The following points are worth remembering in regard to a typhoid epidemic: Those due to milk usually appear suddenly and decline rapidly and the incidence will be greatest among women and children and among the customers of certain dairies. Outbreaks due to water will begin among residents supplied from a particular

source. A large proportion of the cases will be among adults. An examination of the water reveals evidences of pollution. Infection derived from the water of a particular well will be restricted at first to those using it. Where the typhoid fever is spread by contact the cases will be fewer in number, will develop at irregular intervals, and the outbreak will cover a considerable period of time.

Having determined the date of onset of the disease, inquiries will be principally directed to the period of 7 to 21 days prior to that date. Inquiries will cover any unusual visits or possible association with other cases and with persons known to have had typhoid fever the year before. Information should be sought in regard to parties, picnics, and any unusual food consumed. Unless the patient is too ill it is from him rather than friends and associates that information should be sought. Specimens of urine and feces should also be obtained from members of the patient's household.

There are at present under observation in the State of New York, exclusive of New York City, about 56 persons known to be typhoid carriers. Every quarter a report blank is sent to the health officers of the municipalities in which these cases are located. It is of great importance to notify each carrier that he is a menace to the community, as intelligent persons are able to take such care of themselves as to reduce the danger which they constitute to the community. Typhoid carriers are not permitted to handle milk or food supplies intended for public consumption. Where this restriction involves hardship for the carrier by depriving him of his means of livelihood, the State department of health, through the county poor officer, gives a monthly allowance to supplement the patient's earnings in some other capacity. Housewives may prepare food for their families, but not for public consumption. Members of the carrier's family are expected to undergo immunization with typhoid vaccine. Steps are taken to prevent flies from having access to excreta, and draining into water supplies is prevented. The patient is directed to have a disinfecting solution readily available and to clean and disinfect his hands several times a day. It is not considered necessary to inform the public that any given person is a typhoid carrier. The family physician, one member of the family, and the local health officer should be so informed. As the carrier is always averse to having his condition generally known, considerable pressure may be brought to bear upon him to compel obedience to sanitary requirements by threatening to publish his secret, and the health department invariably addresses a letter to each carrier, as discovered, explaining the conditions, outlining the necessary safety precautions, and requesting cooperation with the health authorities. (J. S. T.)

JONES, F. S. **Streptococci in market milk.** Jour. Exper. Med., April, 1920.

The following is the author's own summary of his conclusions:

"The principal source of streptococci in milk is the cow's udder. The udder streptococci fall into two broad groups; those of the larger group agree in cultural characters and agglutination affinities with mastitis streptococci; the smaller group is composed of low acid-producing streptococci. The streptococci of the latter group produce clear zones of hemolysis about surface and deep colonies in horse-blood agar plates. They attack dextrose, lactose, saccharose, and maltose, but do not ferment raffinose, inulin, mannite, or salicin. Acid production in dextrose by the members of this group is about the same as that produced by human streptococci under the same conditions. The limiting hydrogen ion concentration for these pleomorphic udder streptococci in dextrose serum bouillon is within the limits of the limiting hydrogen ion concentration observed by Avery and Cullen for human streptococci.

"All the streptococci from the vagina, saliva, skin, and feces have been nonhemolytic. Those from the saliva form a heterogeneous aggregation in which individuals fermenting raffinose, inulin, and mannite predominate. From the skin a characteristic streptococcus has been found. It produces acid in dextrose, lactose, saccharose, maltose, raffinose, mannite, and salicin, but fails to acidulate media containing inulin. The fecal streptococci are characterized by the formation of large amounts of acid in dextrose, lactose, saccharose, maltose, raffinose, inulin, and salicin. Mannite is not fermented. Neither the fecal nor the skin streptococci have been isolated from the bottled milk with any great frequency.

EVANS, G. H. **Tuberculosis problem in San Francisco.** Am. Rev. Tuberc., March, 1920.

Summary of present situation and of the organized work done during the past 10 years to combat tuberculosis. Open-air schools have not been developed in proportion to the opportunity afforded by the climate. The beds in the tuberculosis departments of the San Francisco Hospital are but 25 per cent of what is needed for advanced cases. The death rate has fallen from 208.9 for 1906-1910 period to 193.6 for 1916.

LANDIS, H. R. M. **An experiment in sanitary education.** Am. Rev. Tuberc., March, 1920.

An interesting account of some of the sanitary and educational work done by the Henry Phipps Institute. In 1913 a small group of houses of the worst type in the city was leased and the institute

proceeded to improve sanitary conditions and outward appearances. A nurse was put in charge of the health education of the tenants, who were all of foreign birth. At the end of three years the institute gave up the supervision of the property and the tenants resumed the management of it. In general, the tenants have maintained the hygienic conditions developed while under the Phipps management. The only noticeable lapse has been in matters of æsthetic effect.

KIRK, E. C.; FONES, A. C.; BUELL, E. E.; GARBER, J. P.; HYATT, T. P.; SAUSSER, E. R. *Symposium on oral hygiene.* Dental Cosmos, April, 1920.

Nearly 50 years ago an American dentist, Willoughby D. Miller, working in Koch's laboratory in Berlin, demonstrated that the decay of teeth was due to germs and reported his observations in a series of papers entitled "The Human Mouth as a Focus of Infection." In these papers Miller elaborated the idea that the absorption of products of germ activity in the mouth caused general poisoning of the body. This was confirmed by Sir William Hunter, of the Charing Cross Hospital, London, and by Sir William Osler. The work of Fones, of Bridgeport, Conn., in the public schools of that city has given practical demonstration of the importance of oral hygiene. He names the following as the three great causes of local or general disturbance arising in connection with the teeth: (1) Insanitary mouths, with decayed and decomposing food; (2) diseased pericemental tissues; (3) devital and infected teeth.

It is estimated that but 15 per cent of the civilian population use a toothbrush. Pyorrhea alveolaris causes systemic infection by (1) exudation of pus in the mouth and thence into the digestive tract; (2) absorption through the lymphatics in the deeper areas of infected tissues; (3) by the pumping action of loose teeth in their sockets during mastication, forcing bacteria and their toxins into the capillaries.

The gingival borders of the gums present an area eight times greater than the crypts of the tonsils, and the congested bleeding gum supplies an ideal culture medium for the tubercle bacillus.

Dental caries is so common that scarcely 2 per cent of school children have sound teeth. Even including very young children, the average is seven cavities per child. Few people reach the age of 30 without suffering infection and destruction of the dental pulp, with resultant devitalized teeth.

The 48,000 dentists of the United States do not suffice to give adequate treatment to more than 20,000,000 of the population. The cost of good dentistry makes it in the nature of a luxury. But 80 to 90 per cent of dental decay is preventable. These facts supply the argu-

ment for the employment of specially trained and educated women as dental hygienists, and a demonstration of what could be done by their means was begun at Bridgeport, Conn., in 1914.

As the real field for prevention is the mouth of the child rather than of the adult, work in this direction has now been carried on in the public schools of Bridgeport for five years. By means of a staff of 26 dental hygienists, 2 supervisors, and 1 assistant supervisor, and 3 women dentists, 20,000 children have received adequate oral care during 1919. After five years of effort the school children of Bridgeport show a reduction of 33.9 per cent in the amount of dental caries present.

Great importance is attached to the omission of free sugar from the dietary. In the course of examining hundreds of drafted men, many Italians were found who, though they had never used a tooth-brush, possessed 32 perfect teeth without cavity or filling. The annual sugar consumption in Italy is less than 13 pounds per capita, as compared with nearly 100 pounds in this country.

Philadelphia should have about 300 persons to carry on systematic work comparable to what is done in Bridgeport, but actually only about 50 are employed. In New York the cost to the city per annum for a child in the public schools is estimated at \$40. When a child fails to pass his examination an additional year's or half year's expense is thrown on the city. In a certain school in Brooklyn there was one room whose inmates had exceptionally poor teeth. Not one of them passed for promotion to a higher grade. The oral hygiene of a public-school child should cost about \$5 a year. Hence, where the mouth is neglected, there is a loss to the city of from \$15 to \$35.

An examination of the public-school children of Chicago showed that 99 per cent of those having physical defects had dental defects. In Cleveland a careful study disclosed the fact that when children had their teeth and mouths put in proper shape there was an improvement of from 40 to 80 per cent in their study efficiency. (J. S. T.)

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GOLSETH, G. **The differential diagnosis between trachoma and follicular conjunctivitis.** *The Journal-Lancet*, February 1, 1920.

The writer concludes his paper with the following tabulation of the characteristic differences between the two conditions:

TRACHOMA.

In the majority of cases trachoma sets in with photophobia, lacrymation, pain and secretion.

FOLLICULAR CONJUNCTIVITIS.

Folliculosis, which makes up 95 per cent of the cases of follicular conjunctivitis, presents no secretion and no subjective symptoms.

TRACHOMA.

The beginning is marked by irregularly placed granulations, which tend to become confluent and with an early involvement of the fornix.

A ring of ocular conjunctiva covered with glistening granulations extends from each fornix over on the eyeball.

In the early stages the fornical conjunctiva of the upper lid is always more swollen, rough, and inflamed than in follicular conjunctivitis, and no areas of normal tissue can be seen in this region or over the lower third of the tarsal plate.

There are no visible blood vessels running across the cul-de-sac.

Spontaneous or induced cure occurs only with the onset of scarring.

Occurs more often in adults.

Pannus and corneal ulcers occur in 20 to 40 per cent of the cases.

Trachoma bodies are found in all fresh cases of trachoma.

(J. S. T.)

FOLLICULAR CONJUNCTIVITIS.

The beginning is marked by small, reddish elevations on the conjunctival surface, which remain sharply demarked, except in the acute type, when they are not so well demarked.

There is no such ring.

In folliculosis there are no changes in the conjunctiva between the follicles. In the acute type there are some changes, but not nearly so marked.

In folliculosis there are no changes in the blood vessels. In the acute type the blood vessels are somewhat obscured, but can always be seen.

There is no scar formation.

Occurs chiefly in school children.

Pannus and corneal ulcers do not occur.

Trachoma bodies are found very seldom.

BEELEY, A. L. **Left-handedness.** Am. Jour. Phys. Anthropology, Vol. II, No. 4.

Investigations of left-handedness have generally been restricted to the question of prevalence, heredity, causes, and relationship to "mirror writing." Various authors have attempted to estimate the extent to which normal human beings are left-handed. Some consider this characteristic present in 2 per cent; others in as high as 6 per cent.

Some students of the subject regard the condition as more common among delinquents. The variation for sex is not agreed on. Negroes seem to be prone to it. Few exhaustive researches have been made to determine the hereditary nature of the peculiarity. H. E. Jordan, from an examination of 700 university students, 1,394 colored pupils in the public schools, and 668 others, concludes that heredity plays some part in the matter.

A good many theories have been enunciated as to causation. In primitive warfare the shield was held over the heart and the right hand was used to wield spear, with consequent development of dex-

terity. Again, left-handedness has been regarded as the result of imitation of parent or merely accidental. The theory of gravitation is based on the fact that the liver and lungs are heavier on the right side, thus displacing the center of gravity to the right and making the use of the right hand more common. But in cases of *situs inversus*, or transposition of organs, there is no left-handedness and the left-handed do not usually show any lateral transposition of the viscera. The greater activity of the right limb has been ascribed to the better blood supply consequent on greater blood pressure in the right subclavian artery. Again, a better cerebral vascular supply on the right side has been invoked as explanation, but the anterior communicating artery would seem to equalize blood distribution to the two hemispheres. Cerebral asymmetry, so far from being a cause, may be the result of left-handedness. It has been claimed that in 96 per cent of all infants the right eye has better vision, and this would lead to greater development of the right-sided limbs. As the proportion of right to left handed people among the congenitally blind is the same as among those who have good sight, this argument falls to the ground. Finally, it is held that the more marked inclination to use the right hand is instinctive.

Mirror writing was studied by the author in 106,356 normal-school children. Of this number only 42 were pure "mirror writers." He inclines at present to the view that mirror writing does not necessarily indicate mental deficiency, but it is a characteristic of extreme left-handedness.

The problem of left-handedness is an educational one, involving adjustment to environment. There are cases of extreme right-handedness and of the opposite. Classrooms, etc., are planned for the right-handed, and thus not only are ordinary tasks rendered difficult for the left-handed but to attempt to overcome the latter condition when well marked is as wrong as to fail to correct it when only moderate in degree. It is important to diagnose accurately at an early period the degree of the propensity to use either hand more than the other. The author, after looking over the various tests used or suggested, has devised one of his own which he considers superior to ergograph and dynamometer, which were impracticable or unreliable. The points essential in a test method are: Discovery of dexterity rather than strength, accuracy, simplicity, close correspondence without identity in its working to the ordinary dexterities required in the school. A tapping test, a steadiness test, a tracing test, were tried simultaneously upon a group of 114 boys in the third, fourth, fifth, and sixth grades. The results pointed to the tapping test as most reliable. As between an arm-tapping and a

wrist-tapping test the latter proved to be the better when used in a second group of 116 boys and girls of the same age. Finally, these two tests were compared with a second tracing test, the latter proving to be the superior one.

The author's paper is illustrated by a diagram showing the principal features of the apparatus, which consists in the main of a board 20 by 8 inches in which is embedded flush with the surface a brass plate 8 centimeters square divided, by grooves running in both directions, into smaller squares. The grooves, 1 millimeter wide and 2 millimeters deep, are filled with an insulating material of china clay and shellac. The surface must be perfectly smooth. In the center of the plate is a black (added carbon to insulating material) line 1 millimeter wide forming a rectangle 6 centimeters square. A platinum stylus 0.75 millimeter in diameter, which with the plate is in circuit of a battery, permits a careful tracing of the heavy black line, irregularities being indicated by the electric counter through the making and breaking of the circuit as the stylus goes from metal to nonconducting material. The child to be examined is required to guide the stylus along the heavy black line. This device shows the number, extent, and time of the divergence from the line to be followed. (J. S. T.)

NEWTON, P. *The Negritos of the Philippine Islands.* Am. Jour. Phys. Anthropology, Vol. III, No. 1.

This interesting article gives the author's observations during a period of 65 working days on more than a thousand Negritos, of whom 400 were carefully measured. The investigations were, when possible, restricted to pure bloods. The Province of Bataan yielded more pure bloods than any other locality. Wherever found the pure-blooded Negritos were physically identical, differing only in minor customs and language. The Negrito is found on the islands of Luzon, Negros, Mindanao, Palawan, Panay, Alabat, and Tablas. This wide distribution suggests that the Negritos were at one time far more numerous in the Philippines than now and that they preceded the other aborigines of the Philippine Islands. They are not travelers, except on their own ranges, and they prefer the highlands, but whether they were originally mountain people or not is unknown. Their predecessors there may represent the last stand of a weak people driven from the plains by a more powerful race. In general they prefer the heavily wooded section for the various kinds of protection that forests afford. They make no wells or reservoirs for bringing water, and when the small streams or springs on which they rely dry up they remove to another locality. They make hardly

any use of plants for medicinal purposes. The animals of the forest are important as a source of food supply, and they trap or shoot with arrows small deer, monkeys, lizards, etc. The Negritos use poisoned arrows. No analysis of the poison was possible, but the symptoms exhibited by the deer shot with a poisoned arrow resembled those of strychnine poisoning. The mosquitoes, so plentiful during the rainy season, making existence unbearable for the white man, produce comparatively little reaction when they bite the Negrito.

The last census of the insular government places the number of Negritos at about 25,000, but the author estimates the total number of pure bloods, outside of several unknown sections in Luzon, at 5,000. There is no marked physical variation in the pure bloods wherever located. Variations in customs, language, etc., are due to contact and environment.

The Negritos dress very scantily. The men wear only a breech-cloth consisting of a strip of cloth 6 inches wide and 4 or 5 feet long. The women wear a short skirt reaching from the waist nearly to the knees; but those who have felt the contact with a higher civilization have adopted the common native "camisa," or waist, and with this has developed some increase of delicacy about the display of their persons. The Negritos wear neither shoes nor head covering and give no attention to their hair, which is thick, black, and woolly and always dirty, matted, and the home of vermin. Both men and women shave a circular area of the scalp in the upper occipital region for the purpose of "letting out the heat." In Bataan ornamental scarring of the skin is practiced from childhood. All Negrito women perforate the lobule of the ear, not for earrings but to ornament themselves with flowers.

The Negrito's dwelling is rudimentary. Sometimes the shelter of a large tree suffices; nothing more elaborate than a couple of uprights supporting a ridge pole covered by a framework of woven grass. This sort of shelter never contains any furniture except a crude seat or bed. The individual shelters are isolated. Small groups of Negritos, connected by family ties, construct them at distances varying from 200 to 800 yards from each other. No sanitary rules are observed. The heavy downpours of the rainy season are relied upon to wash away refuse. During the dry season habitation soon becomes untenable by reason of bad odors and innumerable flies and other insects, and the occupants simply change their place of abode.

When a Negrito develops some severe contagious disease, food and water are placed near him and the family decamps. Every few days some one returns, and if the patient is found to be alive

the supply of food and water is replenished, and this goes on until he dies or recovers. In case of death the Negrito is buried in or near the shelter he occupied during life, and the rest of the family go away.

The Negritos never clean their teeth and never wash. Their only contact with water is for the purpose of cooling off in very hot weather or when they are obliged to ford a stream. Among some groups it is customary to mutilate the incisor teeth. This is done by holding a small block against the inner surface of the tooth and striking the outer surface sharply with the point of a bolo. Decay of the teeth sets in early and is extensive. The only occupation of the Negrito is the procuring of food. They hunt game and gather wild fruits and roots. Sometimes a small area is cultivated and planted with rice in imitation of more civilized tribes, but these amateur agriculturists are perfectly liable to move away before the crop is ripened and to fail to return for the harvest. The only positive result of contact with civilization seems to be the acquisition of a craving for alcohol. In his primitive state the Negrito's bad habits are limited to smoking tobacco and chewing betel nuts (the seeds of the *Areca catechu*, a variety of palm). The food of the Negrito consists of fruit, edible roots, and the meat of deer, wild hogs, lizards, monkeys, birds, and wild chickens. Honey is eaten with relish. The valuable products of the forest are cocoanuts, berries, bananas, and mangos. The Negritos are not fishermen, but they sometimes shoot fish with their arrows when they happen to see them in mountain streams. When food is plentiful the Negrito eats three or four times a day. Otherwise he eats but once. The average Negrito is not industrious and never works unless he has to, and then only for a short time. His amusements consists of dancing and a few simple games.

The Negritos are moral in a negative sort of way; that is to say, they are usually virtuous, but no special stigma attaches to misconduct. Girls marry at 14 or 16 years of age. Both polygamy and polyandry were occasionally observed. A mother usually nurses her babe for 12 or 14 months, but at the sixth month the child is given small bits of such food as the parents may have available. As a race they are not prolific. In the case of 93 families, which were studied and tabulated, there is an average of but 2.27 children per family. The pulse and respiration rate is slightly higher than normal, but the average temperature is the same as that of the whites. It was noticeable, however, that hunger and fatigue invariably lower the pulse, respiration, and temperature. The skin of the adult Negrito is chocolate brown, corresponding closely to numbers 42 and 43 of Broca's color standards.

Stature and head measurement of the Negritos (full-bloods).

	Males (147 adults).			Females (50 adults).		
	Average.	Mini- mum.	Maxi- mum.	Average	Mini- mum.	Maxi- mum.
	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>
Stature.....	147.0	140.2	154.3	138.0	129.6	146.1
Head:						
Length maximum.....	18.0	17.0	18.8	17.4	16.1	18.4
Breadth maximum.....	14.9	13.9	15.6	14.5	13.6	15.6
Height ¹	12.4	11.6	13.1	12.4	11.5	12.7
Indices:						
Cephalic.....		82.7			83.5	
Height-length.....		68.9			71.4	
Height-breadth.....		83.3			85.5	
Height-index ²		75.4			77.8	
Face:						
(a) Height, mentonasion.....	10.0	8.9	11.0	9.4	8.4	10.4
(b) Height, mentocranion.....	17.3	15.5	18.7	16.1	14.3	17.3
(c) Diameter bizygomatic max.....	13.55	12.4	14.2	13.0	12.1	14.0
Facial index, lower $\frac{a \times 100}{b}$		74.0			72.5	
Facial index, total $\frac{c \times 100}{b}$		78.3			80.6	

¹ From line connecting the floor of meatus auditor. to bregma.² Height multiplied by 100, divided by the mean of length and breadth.

The diseases most common among the Negritos are malaria, tinea imbricata, and smallpox. Ten per cent of the total number of Negritos examined showed the characteristic pitting. Dysentery and diarrheal diseases of children are common. Acute bronchitis is common in the aged, and along with pneumonia, is a common cause of death in children. Among Negritos of the pure-blood type venereal diseases are absent.—(J. S. T.)

BREINL, A., and YOUNG, W. J. *Tropical Australia and its settlement.* Ann. Trop. Med. and Par., Vol. XIII. No. 4. (Reprinted from Medical Journal of Australia.)

The particular interest that lies in this article arises from the similarity of conditions existing in northern Australia to those in our own tropical possessions, and from the fact that many observations upon which deductions are premised were actually made in the Philippines.

The consideration of climate from the viewpoint of its effect upon the comfort and well-being of the individual is undertaken with considerable fullness. It is recognized that the usually recorded meteorological observations, the readings of the dry and wet bulb thermometers, give an incomplete and frequently a misleading picture. Though the absolute temperature and the relative humidity of the surrounding atmosphere are most important factors in deter-

mining the degree of comfort to be enjoyed by the resident of a particular locality, there are other elements having a marked influence, and, of these, the most important is wind velocity. Cleveland Abbé's "curve of comfort" was based upon the three factors, air temperature, relative humidity, and wind velocity, and in his charts temperatures were plotted against relative humidities for a given wind velocity. It was early seen by many workers that wet-bulb readings alone were a poor guide, for comfort depends more upon the difference between the readings of the wet and dry bulbs than upon the height of the temperature of the wet bulb alone.

The important consideration in the Tropics would seem to be whether heat loss keeps pace with heat production and absorption. Whether the heat loss occurs as cooling from evaporation in a dry atmosphere, or as the result of wind action, is immaterial. Hill's katathermometer, an instrument devised to measure the rate of heat loss due to atmospheric conditions, is based upon a consideration of the above-mentioned principles. The optimum temperature for physical comfort is usually considered to be between 60° and 70 F., and between these figures it matters little whether or not the air is saturated and the wind blowing; but let the mercury rise to 80 F., and beyond, and it quickly becomes essential to comfort that the atmosphere have a sufficiently low water content to permit rapid evaporation from the body surface with a consequent abstraction of heat, or else that the desired cooling be brought about by the action of the wind. A temperature of 85 F. with a relative humidity of 70, or with a strong breeze blowing, is far more bearable than a temperature of 80 F., plus a still and saturated atmosphere.

A somewhat different factor in producing discomfort is brought into play as the temperature falls below 60 F. Here the higher the degree of air saturation the greater the sensation of cold, because cold moist air abstracts heat from the body by convection more quickly than cold dry air, a chilling process which is greatly accelerated by high wind velocity. Many graphs are presented showing the dry and wet bulb curves, as well as the rainfall, in different localities.

The rôle of sunlight in the Tropics is discussed, with many citations from reports of experiments conducted in the Philippines and elsewhere. The authors say: "The main difference between a temperate and a tropical climate lies in the greater intensity of the sun's rays in the Tropics. This greater intensity is solely due to the less oblique path of the rays striking the earth, whereby they have thus passed through a smaller layer of atmosphere." This greater activity of the sun's rays brings about numerous chemical changes within a very brief time.

A marked bactericidal action of tropical sunlight has been noted by many observers. The question arises whether these changes are

"brought about by those rays of shorter wave length in the violet and ultra-violet portions of the solar spectrum (chemical rays), or are they to be attributed to rays of longer wave length, situated at the other end of the spectrum, the red and infra-red rays (heat rays)?" Aron (1911), in the Philippines, concluded "that the spectrum of the sun's rays does not extend much, if any, further into the ultra-violet in Manila than in northern climates," and that "the rays of the tropical sun having greater wave length than those in the red and ultra-red end of the spectrum (heat rays), play the most important rôle in producing the untoward effects generally attributed to tropical sunlight," and Gibbs (1912), working with Freer and Aron, does not believe that "when the normal intensities are compared, the light of the Tropics is different from the sunlight of any other regions." Woodruff's theory, that the injurious effects of tropical life on the white man result from the action of the ultra-violet rays, is wholly rejected, while such ill effects as are noted are ascribed to heat and not to light.

Much attention is given to the effects of heat and humidity on the animal organism. Sutton (1908), who studied the effects of humid heat on the body, concluded that "all experiments point to the fact that once the balance of the mechanism of heat regulation in the human body has been definitely upset by high external temperatures, combined with almost total abolition of heat loss in evaporation, a vicious circle is established. The internal temperature rises and as a result the oxidation processes—and therefore the production of heat also increases—so that the body temperature rises still further, and so on." Pembrey (1913) came to the conclusion that heat stroke is caused by a continuing rise in body temperature following a breakdown of the heat-regulating mechanism, the result of a humidity so high that sufficient cooling from evaporating sweat is not obtained.

Observations of body temperature in the Tropics did not give results materially differing from those obtained in temperate climates. Evidence regarding the respiratory rate in the Tropics as compared with that in Europe is contradictory and inconclusive. Comparative blood pressure studies have produced no evidence of change attributable to climatic conditions, nor has a tropical anemia, due to climate alone, been demonstrated.

Under the heading "Metabolism in the Tropics," nature's method of body heat regulation is considered. Is the temperature controlled by heat dissipation alone, or is there decreased production as well? Many experiments are cited to show that the maintenance of temperature equilibrium is determined by the rate of heat loss alone (mainly through evaporation of sweat), and that decreased heat production

plays no significant part in the process. The caloric demand in the Tropics does not differ from that in Europe; there is no reduced metabolism.

As regards the nervous system, the consensus of opinion is that a prolonged residence in the Tropics frequently results in a disturbed mental equilibrium, accompanied by an easily recognizable group of symptoms of a neurasthenic nature. To what extent climate alone is responsible for this disorder has not been worked out. It is certain that many factors are involved, and time may show that climate, as such, is one of the least of these.

Much work has been done in connection with the subject of clothing in the Tropics. Black, red, and orange-colored clothing have been tried with the idea of excluding the supposedly injurious ultra-violet rays, but with very disappointing results. A general investigation of the whole matter produced such a diversity of opinions that little could be laid down in regard to clothing beyond the statement that white should be worn when practicable, and that all "garments should be porous and as light in weight as possible."

Much controversy has concentrated on the subject of suitable housing in the Tropics. A construction is to be sought which shields the interior from the direct rays of the sun, and, at the same time, facilitates a maximum circulation of air. Messrs. Lynch and Hunt, architects, with long experience in tropical Australia, prepared the following recommendations as a guide in the erection of small dwellings:

"1. Buildings should face due east and have verandahs to front and back of not less than 9 feet in width.

"2. In addition to other necessary openings, there should also be doors and windows so arranged in every room to allow the wind to enter on the weather side and escape on the lee side. Doors should also be arranged so as to avoid the necessity of retracing one's steps to get to any section of the house.

"3. Buildings should not be more than one room in depth.

"4. The size of a room, built under the most favourable circumstances, should be regulated by the number of prospective occupants. Eight hundred cubic feet per head would be a fair minimum.

"5. Side verandahs and excess widths to other verandahs should not be constructed at the expense of the size of the rooms. Large rooms and limited verandah space are infinitely better than small rooms and wide verandahs.

"6. Blocks should be approximately 2 feet 6 inches above the ground. They should be either brick or concrete.

"7. All buildings should be constructed to resist cyclones.

"8 Fully exposed walls should be double sheeted and ventilated.

"9. Roofs should be fitted with ventilators.

"10. Ceilings should stand 2 feet below the top of top plates. In this connection studding should not be less than 12 feet in length for the smallest cottage and proportionately longer for larger cottages.

"11. Fan lights should be hung immediately under ceilings.

"12. Ledges and corners should be avoided as far as possible.

"13. Roofs should be hipped and continuous, having eaves approximately 2 feet in width, to walls and verandahs."

As a result of many years experience in North Queensland Mr. C. D. Lynch suggests a plan for a novel type of tropical residence, costing about \$5,000. The floor space measures approximately 53 by 66 feet. Within this rectangular area are built of brick or concrete four unconnected rooms—little houses, as it were; one in each of the four corners of the space. Two of these measure 24 by 14 feet, and two 16 by 14 feet. These comprise the rooms of the dwelling and three of the four are divided by partitions into two rooms each. This makes seven rooms in all. The placing of these four structures at the corners of the floor space leaves each separated from the others by two broad intersecting passageways running the length and the breadth of the house. This cross-shaped space is called an internal veranda and is to serve as a general living space and, being open to the wind from every quarter, would be the coolest part of the house. The penetrating breezes would cool the inner walls of the rooms, while the outer walls are double layered, with a ventilated intervening air space. The whole area is covered by a flat roof surrounded by a balustrade. The plan seems admirably adapted to the needs of tropical residence.

The remainder of this interesting article deals with conditions in northern Australia of much local interest, but having little direct bearing on the solution of problems encountered by members of our own service. (R. B. H.)

NOTES AND COMMENTS.

The American Society for the Control of Cancer, with headquarters at 25 West Forty-fifth Street, New York City, issues a monthly bulletin of information for members of the society, State, and local committees, etc. In the January, 1920, issue of this publication, which is called Campaign Notes, it is stated that the United States Public Health Service has a stereopticon loan library for the use of physicians, health workers, etc., free of cost. The slides only, not the lanterns, are loaned, and any breakage due to packing or shipping must be made good. Appropriate application blanks with list of the subjects illustrated may be had on request.

The Policlinico, Rome (Jan. 12, 1920, sez. prat., p. 53), has a spirited editorial on the subject of the rank, pay, and emoluments of the medical officers of the Italian army, drawing attention to the necessity of making army service attractive for medical officers. It would appear that the medical corps has not benefited by recent legislation improving the career of officers of other corps. Promotion is slow, so that medical officers are in the main outranked by their juniors in age and service. They do not enjoy mounted pay or forage, stabling, and orderly allowances; there are not an adequate number of medical officers in the higher ranks; and altogether there is little in the service to make adequate returns for the outlay involved in acquiring a medical education. Reference is made to the important sanitary, relief, and educational work done by the military medical men in civil as well as military life. Prof Luigi Silvagni, president of the federation of medical organizations of Italy, has recently addressed a memorial to the minister of war to the effect that unless service conditions for medical officers are ameliorated it will be impossible for him to recommend the military career to young graduates. The writer in the Policlinico suggests that from this to a boycott of the Government services may be but a short step.

Pierre Sée, writing in *La Presse Médicale* (Feb. 25, 1920), reports investigations undertaken to discover the real cause of the discoloration and destruction of paper commonly ascribed to the "book-worm." From 1721 to 1900 inquiries on this subject lead to the conclusion that an insect was responsible for the aforesaid damage.

Sée calls attention to the fact that insect life would be unfavorably influenced by the cold of northern climates and that it is just in such climates that books suffer the greatest damage. The fact that the spots of discoloration are often slightly raised and that the discoloration often occurs without perforation discredits the idea that the changes are due to a worm of any kind. He has made scrapings and cultures from the discolored areas and claims that some fungus is the true agent involved. He succeeded in cultivating various fungi (*Chaetomium*, *Myxotrichum*, *Eidamella*, etc.) on paper under conditions of moisture, darkness, etc., similar to those that prevail in some libraries. The fungi named were also recovered from certain old books. The *Aspergillus brunneofuscus* was found to give a dark violaceous stain, while the *Stachybotrys atra* yielded a dark greenish one. Sée cultivated the spores on carrot and transferred them to paper sterilized in glass tubes. With sufficient moisture the paper supplied all the essentials for growth.

The source of the original molds is the wood pulp or other pulp from which paper is manufactured and the water used in the process. The sizing employed should also be viewed with suspicion. Through sterilization and resterilization of material and avoidance of humidity during the handling and storing of paper, the process of printing and binding, and in the shops and libraries where books are deposited are essential to prevent the invasion of the destructive molds.

Jessie Taft, director of the department of child study, Seybert Institution, Philadelphia, read an excellent paper on "The Neurotic Girl" before the International Conference of Women Physicians, New York, October 18, 1919. It is reprinted in full, with illustrations, in *Modern Medicine*, February, 1920. The author refers to the frequency with which laymen as well as physicians dismiss certain individuals from their notice with the contemptuous designation, "neurotic," though individuals of this class have constantly contributed to the advancement of civilization. The attainments of Robert Louis Stevenson and Charlotte Brontë furnish no argument for neglecting the neurotic individual, for renouncing the attempt to adapt environment and training to his peculiar needs. Taft confesses to difficulty in differentiating the problems that arise in the life of the neurotic girl and those that arise in the life of every girl. "The normal girl is always somewhat neurotic and the neurotic girl somewhat normal." The attempt to control mental and social life must not be relegated to the small group of psychologists and psychiatrists. Physicians generally must master enough of the psychology of human life to be of service when coming into contact

with moderate abnormalities. The neurotic girl is one who "resists emotional maturity because every stage of growth demands additional effort to which she is unequal." "She will not, or can not without help, meet the increasingly difficult problems of adult life on an adult basis." The psychiatrist attempts to alter the behavior of the abnormal by psycho-analysis and reeducation of the individual. The social worker seeks the same result by improving his physical, economic, and social surroundings. Each method is limited and must be reinforced by the other. "The psychiatrist can use the social worker to multiply his usefulness and influence many times." The social workers, being less specialized, more numerous, and demanding less for their time, are able to study a case in greater detail and do more for bettering the details of a girl's life than the psychiatrist so far as relates to the class which depends on mental clinics because unable to pay for the individual attention of the psychiatrist. The mental clinic reaches a limited group, but an incidental benefit of the war has been to call attention to the importance of social psychiatry, to increase the number of workers in this field, and to enlarge their opportunities for special training.

The general practitioner is not but should be one of the most important promoters of mental hygiene and the woman physician should be conspicuously valuable along these lines. "Teaching sex by the mass method is a doubtful procedure if it can not be followed up by the most careful individual help to the girl who has a problem. The safest way is to give the essentials of sex, with no special emphasis in the natural place in the school, either in biology or physiology. Then the case-work method must be used to meet the emotional conflicts, and nine times out of ten the woman physician will be the one who has the opportunity to help make the adjustment." "If our public schools really educated, if they understood that education involves a training of the instinctive and emotional life as well as of the intellect, if they saw that they can not even develop intellect as long as they ignore desire, we should have an agency for adjusting the neurotic girl and boy second only to the home in its power."

"There is surely no program for social betterment which is so worth a lifetime of effort and interest on the part of the medical profession as a mental hygiene program which has for its goal the use of the public-school system to develop the child, neurotic or normal, into the best adjusted human being he is capable of becoming."

It is against the State laws of Michigan for a druggist, pharmacist, or any other person to sell, barter, or give a remedy for venereal disease except on the prescription of a registered physician. The

department of health is empowered to provide for treatment of venereal disease and to view patients of this class as in quarantine. Venereal diseases are reportable. No person in a condition to transmit venereal disease may be legally employed in the preparation or sale of food, drinks, cigars, etc.

The *Lancet* (July 12, 1919), in an editorial on "The Liquor Traffic and the Public Health," points out that in 1913 there were in England and Wales 1,831 deaths directly or indirectly due to alcohol; 3,880 due to cirrhosis of the liver; and that 1,226 infants under 1 year of age were suffocated in bed, one-quarter of the infant deaths occurring on Saturday night. The Poor-law infirmaries, where records on the point were kept, showed 786 cases of delirium tremens treated. The convictions for drunkenness amounted to 188,877, or 1 for every 135 of the population over 15 years of age. These figures may be most conveniently compared with corresponding ones for 1918 by putting them side by side.

	Deaths from alcohol.	Deaths from cirrhosis of the liver.	Infant deaths from suffocation.	Cases of delirium tremens.	Intoxication convictions.
1913.....	1,831	3,880	1,226	786	188,877
1918.....	296	1,671	557	32	29,019

That the marked reduction in alcoholic casualties is due to Government control during the war period and not to the mere absence of a large part of the male population on foreign military service, is shown by the fact that the decrease has been equally or even more marked in the home-staying female population.

	Women only.			
	Deaths from alcohol.	Deaths from cirrhosis.	Cases of delirium tremens.	Convictions for drunkenness.
1913.....	719	1,665	214	35,765
1918.....	74	579	6	7,222

That simple goiter is a preventable disease is demonstrated by McCord and Walker in *Modern Medicine*.¹

They, of course, exclude exophthalmos, toxic enlargement, the colloid and cystic forms, etc., and refer only to what is known as

¹ C. P. McCord and R. C. Walker, *Mod. Med.*, February, 1920, p. 124.

endemic goiter, "big neck," etc. The disease prevails on a large scale in certain definite localities, such as Switzerland, portions of India, Brazil, and in certain small restricted areas, but is also very generally present everywhere. In the United States the peculiar goiter area is the Great Lakes Basin, but there are centers in the Rocky Mountains, Montana, Mississippi, etc. In general the Atlantic States have a lower incidence than the Middle West, while in the Western States the disease is so widely diffused as to be a matter of public concern.

Marine and Kimball examined 3,872 girls between the fifth and twelfth grades, of Akron, Ohio, in April, 1917. Of these, 2,184, or 57 per cent, were found to have simple goiter. In West Virginia in 1913 Clark examined 13,836 school children and found goiter in 9 per cent. In Virginia, out of 6,432 children in 9 different counties, 12 per cent were affected. Hall examined 3,339 students of the University of Washington. Of the 2,086 men of 20½ years average age, 18 per cent had enlarged thyroids. Of the 1,253 women of an average of 19¼ years, 31 per cent were similarly affected. In Europe the percentage of large thyroids in school children is greater than in America. From 77 to 89 per cent of the school population of Bavaria have this development defect.

It is perhaps not generally known that the disease is widely present in animals—swine, sheep, dogs, etc. In the early days of sheep raising in Montana the prevalence of goiter made the pursuit unprofitable until the use of salt from certain mines near Detroit led to gradual disappearance of the disease. This was due to the occurrence of iodine as an impurity in the salt. In Montana alone it was estimated that a million pigs were lost annually from this disease. In Cleveland 90 per cent of the dogs are affected.

The disfigurement and inconvenience due to enlarged thyroid may be prevented by the prophylactic administration of iodine, though only 30 per cent of the fully developed cases subside under medical treatment. "For 2 cents a year any child may be saved the disfigurement and the physical and mental disturbances accompanying goiter."

Twice yearly, at six months' interval, iodine salts should be administered in small doses over a period of 10 days to children entering in the second decade of life. Either potassium or sodium iodide may be used. Experiments were conducted by Marine and Kimball to demonstrate the value of the treatment. Each girl in the fifth, sixth, seventh, and eighth grades of a certain school section received 0.2 gram sodium iodide daily for 10 days. Of course those having fully developed goiter or other than the mildest form of the simple type were excluded from the experiment. No harmful results followed the treatment of 4,415 girls, but five-tenths of 1 per cent de-

veloped a trifling, evanescent iodine rash. Of 283 having normal thyroids at the time of the experiment, not one developed any enlargement. Of 996 who were normal and did not take the treatment, 26 per cent developed slight goiter. Of 428 young women with slight enlargement, 33.5 per cent were entirely relieved between April and November, whereas in 769 young women with slight goiter who did not undergo treatment, only 1.2 per cent showed spontaneous subsidence of the tumor.

Industrial and school physicians and health workers should put the treatment into practice and disseminate the information necessary for the intelligent and effective employment of the simple preventive measure here set forth.

According to the "Survey," New York, January 31, 1920, the Australian director of quarantine, J. H. L. Cumpston, M. D., D. P. H., has described in an interesting monograph the remarkable results obtained in Australia by quarantine against the influenza in 1918. Beginning in October, every vessel coming to Australia which had suffered from cases of influenza during the voyage was subjected to the strictest quarantine, and even vessels which had had no cases were on arrival in Australian ports kept under observation for a period of seven days if they came from countries where the epidemic prevailed. It was apparently as a result of these measures that Australia enjoyed complete immunity from the disease during October, November, and December. In January, 1919, a very mild form of influenza made its appearance in Australia, but it was so different in type from that which raged in other parts of the world that the director of quarantine considered it "the product of a slow evolution of an influenza period established in Australia" in the summer of 1918.

Captain F. L. Pleadwell, Medical Corps, United States Navy, writing for the "Annals of Medical History," has produced a delightful paper on W. P. C. Barton, the first chief of bureau of the Medical Department of the Navy. The sketch is reprinted in full in the March number of "The Military Surgeon." Every member of the Medical Corps will be rewarded by a careful perusal of this valuable historical document. We note only a few of the interesting points throughout.

Dr. Barton was the first head of the Bureau of Medicine and Surgery, 1843. He was opposed to the title surgeon general, which was not employed in the Navy until 1869, when it was conferred on W. M. Wood. Barton, in 1838, addressed a memorial to Congress setting

forth his objections. Barton introduced many important reforms in the administration of medical affairs in the Navy and provoked much hostility, as is usual with all reformers who have the courage to go counter to the personal interests of others for the general good. Among other strongly held opinions, was his belief in promotion by seniority considering it "that principle which is the life of naval and military service." He believed that "contentment, comfort, honorable pride, harmony, order, subordination" were best secured by promotion by seniority. He advocated reforms in naval uniforms and urged equality of honors and distinctions for staff officers and spoke of how keenly medical officers, both old and young, felt their "nonentity in the pageant part of discipline." Barton, in his appeal to the Secretary of the Navy, says: "The epaulette and epaulettes, if allowed, go far to abate this grievance, though nothing but a positive accredited rank will wholly reject it." He made a strong plea for definite rank for medical officers.

Barton, in his first report as chief of bureau, recommended the purchase of a "small, compact medical and surgical library for each vessel of war * * * and also for hospitals and sick quarters." He was an earnest believer in special schools of instruction for naval medical officers and for the military administration of naval hospitals. He was anxious that medical officers should receive such adequate compensation for their services as to make them independent of private practice; that furnished house and quarters be provided for them ashore at hospitals, etc. He objected to the practice in vogue in his day of allowing fees for certain types of medical service to the Navy personnel. He was an advocate of hygienic improvements aboard ship and urged the assignment of definite screened-off spaces for the use of the sick.

Barton was a strong advocate of temperance and considered that a rum-drinking doctor was an abomination that had no place in the service. This is remarkable for the times in which he lived, but more wonderful still is the fact that on one of his cruises his precept and example resulted in the steering officers eschewing liquor and adopting water as a regular beverage.

It is impossible to read Captain Pleadwell's paper and not be impressed with the force of character and the versatility of talents displayed by our first chief of bureau. He had at heart the good of the Medical Corps, and in his many plans and suggestions for its improvement was far ahead of his time.

His personal fortunes were varied and checkered. He made many enemies and was more than once in the bad graces of Secretaries and other notabilities, but, on the other hand, he was befriended and esteemed by such men as Decatur and Porter. He underwent a

remarkable trial by court-martial in 1818, to which President Monroe was summoned as a witness.

Dr. Barton was for a while lecturer on botany and materia medica at Jefferson Medical College, Philadelphia. He wrote a number of works dealing with naval hygiene, naval hospitals, hygiene in the Tropics, the teaching of materia medica. He was a great lover of music, a ripe scholar, and in every way a fine type of the sagacious, courageous, earnest, and accomplished medical officer.

Medical officers desiring more information on the subject of making blood-pressure estimates than is contained in the booklet which accompanies the apparatus issued by the supply depot may consult "Blood Pressure: Its Clinical Applications," by G. W. Norris, A. B., M. D., assistant professor of medicine, University of Pennsylvania, Lea and Febiger, Philadelphia, Pa., 1917, third edition.

Statistics of the fatalities of 12 large American cities show that for the decade from 1909 to 1918 automobile accidents were responsible for 33.8 deaths per million of population in the first half of the period and for 99.4 per million of population in the second half.

In 1906 there were 183 fatalities from automobile accidents, but in 1917 there were 624. The lowest fatality rate observed was in New York. One-half the fatalities are in persons between 20 and 59 years and 40 per cent in those under 20 years of age.

Egyptian Medical School, Cairo. The idea of such an institution originated with French surgeons at the time of the Napoleonic occupation of Egypt. The war with Germany hindered the plans which had been formulated to greatly expand the Egyptian Government School of Medicine. At present there are accommodations for but 50 students: and as there are three times this number of applicants, the buildings erected in 1837 are to be replaced by new and larger ones. A new hospital is to be put up, as the present one has only 600 beds. Salaries of professors will range from £600 to £1,200 per annum. The curriculum will cover five years. The acting director is Col. Owen Richards, recently consulting surgeon with the British armies in France.

"The Salvation of the Army." Deterioration of character from idleness in barracks, waste of time during the period of a man's life which should be the most productive, the frequency of suicide among soldiers—these are some of the favorite texts from which to preach

to men against enlisting. We are rather pleased to note that the American craze for publicity has not yet brought into disrepute a far-reaching, carefully worked-out plan soon to be in full operation to render service in the United States Army attractive to men who have capacity and ambition and who, while glad to acquire some familiarity with things military, yet shrink from committing themselves to three years of drilling at an Army post.

Col. R. I. Reese, United States Army, is the military supervisor, as chief of the Education and Recreation Service, having associated with him a civilian board of education under Dr. C. R. Mann, chairman, and J. R. Randall, secretary, of a movement to confer on all enlisted men desiring it an educational course of a distinctly practical character in any one of some 17 special branches, such as textile work, carpentry, dyes, highway construction, agriculture, trade, etc. General education along the lines of English, arithmetic, etc., will also be available. There are now assembled at Camp Grant, Ill., near Rockford, some 75 workers engaged in elaborating the details of the various courses, preparing manuals, and training instructors so that they can conform to Army methods and master the best ways of conducting the proposed classes. This camp will serve as a sort of normal school and have its sessions during the summer months. The winter months will be the time for instructing the men, and teachers will be assigned to camps all over the country. When the plan is in full operation some 6,000 instructors will be needed and provision will be made for some 200,000 pupils. The men desiring to take the more specialized courses that require a mechanical and laboratory outfit will be transferred to certain special centers. The rest will be taught at the posts where they are on duty. Men who elect to take a course will be allowed to devote about half their enlistment period to it. Once voluntarily enrolled for instruction, a man will be required to be regular in attendance, diligent in work, etc., as the course will then be a part of his military duty. A course in citizenship will be obligatory for all who enroll.

The editor recently had the pleasure of an interview with Prof. S. E. Bedford, instructor in citizenship in the Army school, and realized the vast possibilities for good in the comprehensive scheme now maturing. Prof. Bedford is temporarily on leave from his chair in the University of Chicago. The instructors in the Army educational organization are for the most part professors in schools and colleges and only temporarily assigned to this duty. Many of them will doubtless make the new venture their life work.

The scheme here crudely outlined has been referred to by Army officers and certain well-wishers of the service as the probable "salvation of the Army."

REPORTS.

STUDY OF HEALTH CONDITIONS IN SANTO DOMINGO.¹

By G. F. COTTLE, Lieutenant Commander, Medical Corps, United States Navy.

The Dominican Republic is located in the West Indies, between 17° and 19° north latitude and 68° and 74° west longitude, on the island of Haiti. It occupies the eastern two-thirds of the island, separated from the Haitian Republic by a high mountain range traversed by a road at only one place. The Republic itself is divided into a northern and southern portion by a high mountain range, across which at one point there is a trail everywhere difficult and at times impassable. For local administrative purposes the Republic is divided into 12 separate portions. For certain general administrative purposes the military government has called that section of the Republic north of the central mountain range the northern district and that part south of this range it has divided into a southern and eastern district. For purposes of sanitary administration the country is divided into 12 districts, whose geographical limits correspond in general to the limits of the original Provinces and districts.

The northern district contains seven of the subdivisions called Provinces, as follows:

Local province.	Population.	District sanitary No.	Principal towns.
Province of Santiago.....	123, 972	10	Santiago.
Province of La Vega.....	105, 000	8	La Vega.
Province of Puerto Plata.....	55, 864	11	Puerto Plata.
Province of Espaillat.....	64, 108	9	Moca, Salcedo.
Province of Samana.....	12, 675	6	Samana, Sanchez.
Province of Pacificador.....	90, 569	7	San Francisco de Macoris.
Province of Monte Cristi.....	41, 459	10	Monte Cristi.
Total, northern district.....	493, 647		
Total, Dominican Republic.....	795, 432		

The total area of the Republic in square miles is 19,325. Somewhat less than half this area is taken up by the northern district. The density of population is, then, 41 persons to the square mile. The

¹ Extract from an official report submitted to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C. The portions of the report covering sanitary laws and regulations are printed in Notes on Preventive Medicine for April, No. 93.

largest city in the northern district and the second largest in the island is Santiago de los Caballeros, the population of which is probably not over 22,000, though it is given as 45,000. The other towns in the northern district above mentioned vary from one or two to six or eight thousand inhabitants each.

The people—a mixture of Spanish, Indian, and (African) Negro—are Spanish in ideas and traditions. The Spanish and Indian predominate in the appearance and manner of the more wealthy classes and the Indian and Negro are more evident in the lower classes. The basic industry is agriculture, though many persons are engaged in business on a small scale as shopkeepers, tradesmen, brokers in tobacco, cacao, sugar, rum, etc. The Dominicans are intelligent, not impoverished, cleanly, well clothed, well fed, and, for the climate, well housed. All but a small fraction are illiterates. The relatively small number of educated persons makes up the professional and political classes. Schools, now in operation everywhere, are rapidly reducing the illiteracy for the coming generation. About one-half the population lives in towns, the other half in villages or on small farms. Towns are at sea level or on the plains not much over 500 feet above sea level. Farms are on the level or rolling plains for the most part, though a few are found on the lower hillsides. American ideas and products have brought shoes to every family of this once barefoot race.

Food is abundant. Cattle, sheep, goats, chickens, turkeys, and guineas are plentiful and relatively cheap. Fish are readily obtainable at Samana Bay and at Monte Cristi. The farms produce an abundance of yams, yucca, sweet potatoes, beans, plantains, bananas, avocados, mangos, coffee; cacao, sugar cane, some corn, breadfruit, oranges, limes, and many other tropical fruits and vegetables in lesser amounts at different seasons. Excellent milk stations, good slaughterhouses, bakeries, public markets, ice plants, excellent cafés, fair to poor restaurants and hotels exist.

The climate of the northern district is in general tropical, though the mountains in winter are subtropical, as is evidenced by the growth of a variety of pine. The northern shore of the northern district is hilly and mountainous, with very little level land close to the sea. Between this northernmost range of mountains and the central range is a broad fertile valley, the Cibao, not much more than 500 feet above sea level for the most part. Two briskly flowing rivers or streams drain this valley and the bordering mountains, one emptying into Samana Bay at the eastern end, the other into the sea at Monte Christi at the western end. The land about the river mouth at Samana Bay is marshy; that about the river mouth at Monte Christi is less marshy, mostly salt marsh. Both marshes are mosquito laden and of considerable extent.

A peculiar feature of this valley is the wind, which blows from east to west during practically every hour of the day and nearly every day in the year. This breeze is, as a rule, of moderate or low velocity. So continuous is it that it has determined the position in which houses are built, streets laid out, and the place where garbage dumps, slaughterhouses, etc., will be least objectionable in the cities. This breeze also has determined the agriculture of the Cibao and affects every part of its life. Blowing over Samana Bay at the eastern end of the Cibao, it comes water laden from the sea, so that rainfall, light or heavy, is the rule every day in the year. As the breeze passes along over the Cibao it becomes less and less water laden, so that the center (Santiago) of the country is semiarid. By the time the breeze reaches Monte Christi it is dry, and there rain is the rarest occurrence, coming for but a few (17) days in the entire year. No accurate measure of the rainfall is available. The distance from the head of Samana Bay to the head of the bay at Monte Christi is not more than 150 miles, yet in that short distance any sort of rainfall desired can be found. On the narrow strip of northern shore beyond the northern range of mountains the rainfall is that of most tropical islands, periods of very heavy rain, alternating with periods of drought. Here the breeze is variable, but still it comes for most of the year from an easterly direction.

The eastern end of the northern district is relatively hot and humid, the central relatively cool and semiarid, the western end hot and dry. The vegetation of the eastern end is luxuriant and tropical, that of the central Santiago region green in winter and brown-green in summer, that of the western end brown and gray-green cactus and brush except where irrigated. The temperature of the Cibao as a whole is not extremely high even in the summer months. It is said to range from 55 F. on winter nights to 90° or perhaps 100 F. in the shade on the hottest days in summer. The nights are always cool and the breeze makes living, except in the direct sunlight, comfortable even in the hottest part of the summer day. Sunstroke is practically unknown. Deaths from lightning are very rare. Electric disturbance and earthquakes are of very slight intensity. Hookworm and malaria are common.

The two principal rivers, the Yaque del Norte and the Yuna, contain at all seasons a supply of water sufficient to meet the household needs of the population, though a certain number live too far from the river banks to use this supply. The tributaries of these rivers and many mountain streams add to the available supply during times of rain. In the dry region and during dry times cattle and people depend on rain water caught in holes dug in the ground and upon cisterns, barrels, tanks, etc., near the houses. Three of the

towns have water-supply systems. Santiago has a partially filtered, partially sedimented, reasonably potable supply adequate for the present needs of the city. It is pumped every night from the river, the intake being a little above the town, and the reservoirs have a capacity of: Large, 1,225,000, and small, 300,000; total, 1,525,000 gallons, or a per capita per diem allowance of 7 gallons. The Puerto Plata supply, coming from a mountain stream dammed up in the hills above the town, is inadequate during the wet season and more inadequate during the dry season. It is not filtered or sedimented. Its reservoir capacity is small. The Monte Cristi supply comes through pipes into the city and has practically no reservoir. This supply is heavily and dangerously contaminated at its source, and it is so piped as to increase its contamination while flowing to its outlet. Its daily amount is limited only by the size of the pipes and the volume of the river, which at Monte Cristi is not only sufficient to meet the daily needs of the town but also sufficient to irrigate the large area of fertile arid soil near by. Hard water is not in use in the households of the island. Bacteriological examinations have shown that only rain water collected in clean containers can be considered safe without either boiling or chemical purification. The bacterial content of the water at Puerto Plata and at Santiago, though considerable, does not cause a great deal of enteric disturbance in the native population, though enteric diseases are present to some degree at all times. Diarrhea and typhoid fever and paratyphoid must be expected in those who come from other countries if they use the water without some form of purification. Except in a very few places, well water and spring water are not used. Schistosomiasis, typhoid, paratyphoid, and diarrhea are the diseases directly attributable to the water. Malaria, in the dry areas about water holes and in the marshy areas, must be considered as indirectly due to the methods of handling water supplies, and dengue, if transmitted by the *Stegomyia* and *Culex*, must be considered due in a degree to the methods of storing water in uncovered tins, buckets, basins, etc., near the houses, which make breeding places for the mosquito.

Cesspools, earth pits, and evaporation are the methods of kitchen and latrine disposal. Open gutters and drains carry off both water, storm water, and the urine from stables, either to river bottoms, to pools near the cities, or to pools within the towns where evaporation and slow or rapid soil seepage constitute the method of final disposal. No definite plan for the cleaning of cesspools, earth pits, pools, gutters, drains, etc., exists in any of the towns. When these methods of drainage disposal become too objectionable corrective steps are taken by the persons who are irritated by the condition.



Santiago de Los Caballeros, Dominican Republic.



City Hall. Santiago de Los Caballeros, Dominican Republic.



A city street after heavy rains.



An improved street paved and guttered.

ely by the local municipal authorities. Corrective ef-
 when the objectionable features are reduced to a point
 can be temporarily forgotten, or to a point where a
 fall so dilutes the nuisance as to temporarily lessen its
 le features. No sewers are in use in the northern dis-
 tricts are for the most part impaired and poorly guttered,
 and alternates with mud, or both nuisances exist at the
 in the one street.

andant brilliant sunlight alternating with frequent down-
 rain in most parts of the northern district combines with
 pigs, ants, cockroaches, and other insects in an endeavor
 e insufficient and fairly inefficient street cleaning and gar-
 bage removal officials in their efforts at civic cleanliness. In the
 ere rainfall is abundant gutters are for the most part good,
 rains keep the towns fairly clean. In places where less
 occurs and this great natural washing is lacking fewer
 are built and the inefficiency of the street-cleaning depart-
 becomes more evident. Plans for a storm sewer and house
 ere made for Santiago two years ago, but no steps to build
 use sewers have been undertaken; the storm sewer is 25 per
 cent finished, but not yet in use.

to Plata and Santiago are lighted by electricity; the other
 of the district by acetylene and kerosene.

a warm climate the small number of flies is remarkable. The
 breeding conditions seem on first thought to be very favorable to
 breeding.

Many poorly fly-proofed pit latrines.

Use of back yards as stables without removal of manure.

The practice of throwing banana peelings, mango skins, orange rinds,
 and other garbage into the streets, gutters, and vacant lots and allowing it to
 rot.

Garbage dumps on outskirts of cities and towns without incinerators.

However, these many fly-breeding agencies are widely scattered in
 the more or less thin area and all, at least once a day, are exposed to
 the heat of the tropical sun until dessication has occurred almost to
 the point of actual incineration. Decomposition of all this organic
 matter does not occur as it does in less sunny climates, but rapid
 drying, almost a charring, by the sun occurs. If in some spots the
 breeders are protected from the sun, fly breeding proceeds to the
 final stage, but many of the larvæ fail to emerge as flies because
 they die for the lack of moisture in their food, and it is the belief of
 the writer that the ants attack the larvæ in large enough numbers to
 crush them up. In those sections where rain is more frequent flies are
 more numerous. In the sections where rainfall is intermittent flies
 are abundant after a rainy period when for several days or a week or so

clouds obscure the sun, but as soon as the sun has again had time to regain the ascendancy and dry the topsoil to a hard caked layer the flies practically disappear. Where rain falls every day with sunshine every day flies are rare.

No accurate survey has been made of the mosquitoes. Puerto Plata, Monte Christi, and Sanchez seem to have mosquitoes in the greatest number. Both benign and malignant malaria exist in the population.

HOSPITALS.

	Beds in use, aver- age.	Maxi- mum bed ca- pacity.	Nurses.	Doc- tors.	Phar- ma- cists.	Sis- ters.	Supported by—
Santiago:							
Private clinic.....	10			1			Fees.
Do.....	10			3			Do.
Hospital, civil, San Raphael.	(¹)	60		1			Società de la Cari- dad.
Field hospital, Fourth Regiment, United State Marine Corps.	21	50	² 10	3	2		United States Navy.
Sick bay, Guardia Na- cional Dominicana.				1			Military govern- ment, Dominican Republic.
La Vega:							
Hospital, civil, La Hu- manitaria.	30			2		4	City council dona- tions and lottery.
Municipal Hospital, Ri- cardo Limardo.	20		1	3			City council dona- tions.
OUT-PATIENT CLINICS.							
Santiago:							
Saja de Socorro, ambu- lant cases, poor, first aid, and emergencies.	³ 400		⁴ 1	1	1		City council.

¹ None.² Hospital Corps.³ Persons treated a month.⁴ Practicante.

The hospital at Puerto Plata is well managed, reasonably equipped and maintained, has an excellent nurse in charge, and a staff of paid and unpaid physicians, and rooms for two or three private cases. It has no laboratory, no autoclave, and no surgical instruments. It is well located on a hill back of the city, and well built of stone. Its cases are mainly chronic and emergency. The hospital at La Vega is managed as well as can be expected of a group of untrained sisters, without proper medical staff, working in an unfinished building with almost no funds except for food. It has no equipment except native beds, no instruments, no autoclave, no laboratory, no provision for private patients. It is clean, and the sisters are deserving of praise for their efforts. Patients are mainly of the almshouse type. The Hospital San Raphael, Santiago, consists

of a group of five buildings, well located on the edge of town. Three buildings of stone and mortar are finished and two are partly finished. There is an excellent equipment already purchased and installed, lacking only sterilizers, kitchen utensils, and laboratory material. The only medical staff consists of the accepted offer of a local physician to do whatever surgery may be necessary. The society has no definite plans for operation and maintenance, no plans for proper medical and nursing staff. The two private clinics at Santiago are well equipped and well managed by the physicians, who care for their private practice with these clinics as accommodation for their private patients. The field hospital of the Fourth Regiment is well equipped, has an excellent laboratory, sterilizers, autoclave, and a medical, pharmaceutical, and nursing staff composed of personnel of the United States Navy. The sick bay of the Guardia Nacional Dominicana is fairly well equipped, and has an excellent personnel (of naval medical officers and hospital corps) with Guardia Nacional Dominicana hospital corps in training. The field hospital meets the needs of the Guardia Nacional Dominicana whenever necessary.

At Moca, Sanchez, Puerto Plata, La Vega, Macoris, Monte Cristi, in addition to the above medical facilities, the Fourth Regiment, United States Marine Corps, maintains small sick bays to meet the needs of the personnel of the Guardia, and the few civilian practitioners and the military practitioners do what they can in the way of medical treatment for the civilian population.

There is a considerable number of licensed pharmacists with well-stocked pharmacies in the cities of the northern district. In addition nearly every crossroads has a store in which certain drugs and household remedies are on sale. The custom of the people when ill is to go to the pharmacy or the crossroads store, discuss the ailment or accident with the person behind the counter, and then purchase the drugs or other materials considered necessary to meet the symptoms. When ill the people as a rule go to the doctor only as a last resort. Patent medicines are extensively used. There are a few licensed dentists in the towns of the northern district—not more than one for every 15,000 of the population.

There are a few licensed midwives in the towns, districts, and provinces of the northern district. The seven provinces of the northern district have perhaps as many as 10 licensed midwives each.

Health laws and regulations have been made and brought up to date by Commander Reynolds Hayden, Medical Corps, United States Navy, the chief sanitary official of the Dominican Government. These laws replace the old sanitary laws and regulations of the Republic, which were incomplete and not entirely in accord with modern public health knowledge.

HISTORY OF THE U. S. S. "POCAHONTAS" DURING THE WAR.¹

By M. BOLAND, Lieutenant Commander, Medical Corps, United States Navy.

The S. S. *Prinzess Irene* had run between Hamburg and New York and had also been cruising to the Mediterranean and Far East. In Bordeaux, in December, 1918, I met a naval medical officer who had returned to the United States from the Asiatic station as a passenger on this ship some years before.

By Executive Order No. 2651, dated "The White House, June 30, 1917," authority for which was contained in a joint resolution adopted by Congress and approved by the President on May 12, 1917, the President directed the United States Shipping Board to take "possession and title" of the S. S. *Prinzess Irene* and 86 other enemy ships; to "repair, equip, and man; to operate, lease, or charter the same in any service of the United States or in any commerce, foreign or coastwise."

Upon my reporting for duty on July 23, 1917, in connection with fitting out the *Prinzess Irene*, it was found that a number of officers and men were already aboard, among the officers being a junior medical officer, who had already submitted tentative plans for the sick bay, etc. These plans and the ship were inspected, after which the sick-bay plans were modified in some particulars. Then, on the afternoon of the 23d Commander J. F. Hellweg, United States Navy, commanding officer; Lieutenant Commander B. H. Green, United States Navy, executive officer; and myself visited the construction and repair department at the navy yard, New York, and had a lengthy conference with Naval Constructor H. T. Wright, United States Navy, in regard to the work of refitting the ship for transporting troops. Work had been going on in the engine room and holds for some time and was commenced in quarters selected for the sick bay on July 25.

The members of the crew aboard were billeted and messed on the *Kaiser Wilhelm II* (now the U. S. S. *Agamemnon*), at that time acting as receiving ship, and the officers lived ashore, getting lunch on the receiving ship.

On July 25, 1917, about 4 p. m., Commander Ryan, United States Navy (retired), aide to the commandant, came aboard with telegraphic orders (Bunav dispatch 15423 of July 23, 1917) from the Navy Department to put the ship in commission immediately. Colors, commission pennant, and a bugler were hastily borrowed, and 8 officers, some in white, some in blues, and some in dungarees, and about 20 enlisted men, no two in the same kind of uniform, and mostly barefoot, were assembled on "B" deck, starboard side aft.

¹ This report, compiled from ship's data and private memoranda, furnishes a comprehensive picture of the vicissitudes of life on a transport in war time. (Editor.)

near the present sick bay. Commander Ryan read the order placing the ship in commission as the U. S. S. *Princess Irene*. The bugler sounded "colors" and the colors were broken out from the main-mast at 4.40 p. m. and the commission pennant hoisted.

About July 28 a wardroom mess was started, a seaman who "admitted" that he knew something about cooking was installed in the galley, and with newspapers for a tablecloth we were "off." Sugar, salt, and pepper were on the table in cups, with a spoon in each. At breakfast the first morning the coffee tasted salty and everybody thought they had "sweetened" their coffee with salt. A new lot of coffee was obtained and this time the sugar was tasted before being used, but the coffee was still salty. Our friend the cook was sent for and asked where he got the water to make the coffee. He said he dipped it from over the side with a bucket. We were then lying in Wallabout Basin.

The date originally set for completion of repairs was August 1; this was advanced to August 15, and later several times, until finally she started on her trial trip at 6 a. m., August 29. In the meantime repairs were going on. Several small fires occurred in the life preservers stored in the second-class saloon, now the after mess compartment. On August 11 a new boat fall carried away during a test, and upon examination it appeared that an acid had been injected into the heart of the rope with a hypodermic syringe, the damage being not apparent to ordinary observation. The ends were sent to the naval hospital, Brooklyn, for chemical examination, and the chemist reported approximately 1 gram of commercial hydrochloric acid recovered; apparently it was the work of an enemy who hoped to render the boat useless at sea.

We left the yard at 6 a. m., August 29, for a trial trip; at noon a fire broke out in some life preservers, life rings, and Jacob's ladders stored in a small deck house just abaft the after funnel on the boat deck. Some difficulty was experienced in getting the pressure on the fire main to raise water to the boat deck. In the meantime pyrene and hand grenades were used. Finally pressure was obtained and the fire extinguished. At 4.21 p. m., August 29, anchored off Ninety-sixth Street in the North River, where we coaled and took on provisions.

On September 2 proceeded to Pier 1, Hoboken, for troops. September 3 Lieut. Col. Clark, United States Army, from the surgeon's office, Port of Embarkation, came aboard and inspected the ship. All the holds were fitted with wooden standees in tiers three deep. Upper No. 2 hold was kept for a troop mess room. At 11 p. m., September 5, M. A. Ryan, painter, third class, fell from his hammock, fracturing his skull, and was sent immediately to St. Marys Hospital, Hoboken.

The U. S. S. *Princess Irene*, on September 7, 1917, was renamed U. S. S. *Pocahontas* in accordance with instructions in Bunav. telegram 09304, dated September 4, 1917. The tug *Pocahontas* was renamed *Chemung* on the same day. The New York Herald Co. presented Captain Hellweg with a steel engraving of the Indian princess Pocahontas, from a statue by Barnard. This engraving still adorns the wardroom, occupying the place formerly devoted to an oil painting of Princess Irene, sister of the former Kaiser Wilhelm II, for whom the ship was named.

On September 7 embarked 138 officers and 2,421 troops of the Ninth and Twenty-third Infantry. Under way at 5.17 p. m.; anchored at Tompkinsville at 7 p. m.

At 10 p. m. under way for the first trip, convoyed by the U. S. S. *Huntington* and destroyers *Duncan* and *McCall*. The other ships in the convoy were the *Pocahontas*, *Huron*, *Henry C. Mallory*, *Tenedores*, *Pastores*, *De Kalb*, and the collier *Maumee*. Accompanying us on this trip was one civilian, Mr. Howard Wheeler, editor of Everybody's Magazine, who was en route to Europe to secure Mr. Brand Whitlock's story "Belgium," which later appeared serially in Everybody's. He also wrote an article entitled "The Skipper," on his impressions of the trip, in which he paid a high tribute to our beloved captain, Commander Hellweg. The article appeared in Everybody's Magazine for April, 1918.

During the night of September 8 the starboard engine broke down and we lost the convoy; went ahead on port engine and repaired starboard; heard nothing from convoy all the day of the 9th, so thought we would have to make the best of our way across alone, as the convoy was by that time so far ahead we could not hope to overtake it. Early on the morning of the 10th received peremptory orders to rejoin the convoy at a given point and to do this it was necessary to steam west; fell in with the convoy about noon (the 10th) and, in obedience to orders from the convoy commander, steamed alongside the *Huntington*, the captain making a verbal report to the convoy commander regarding condition of engines.

Had serious trouble from the beginning with the sanitary flushing system, frequently having to bail water from over the side to flush No. 1 troop latrine. Drain pipes from latrines frequently clogged and plumber reported them stopped with such things as whole rolls of toilet paper, leggins, underclothes, old shoes, and, in one instance, a mess kit.

There was not a light on the ship outside of engine and firerooms and chart house. Officers' and crew's quarters, galleys, pantries, passages, and troop holds were in absolute darkness. On the night of September 15 it was reported that a soldier in lower No. 5 troop hold was having a "fit." The executive officer and myself went

below with flash-lights and located his bunk, but were unable to locate the man himself. He fell through his bunk upon the man sleeping under him, but apparently was all right the next day, as he was never located. On September 15 target practice was held. On the night of the 16th, slop chute forward carried away and there was about 6 inches of garbage on the deck. This was collected in barrels and immediately dumped overboard on the lee side. Garbage was collected in the chutes throughout the day and dumped during the midwatch, all cans being cut through so they would sink.

Had trouble with Army officers smoking after lights were out. One officer was detected lighting a match about 9 p. m. one night, and was reported and recommended for a general court-martial for endangering the whole ship by showing a light.

The *Huntington* had an observation balloon which was kept several hundred feet in the air from sunrise to sunset with an observer in the basket. At 9.39 a. m., September 17, the balloon was struck by a sudden squall, became unmanageable while being hauled in, and whipped down to the water, then back to the length of its cable a number of times; finally it lay on the water, wrecked, but the observer, with a number of broken bones, was by this time unconscious. A shipwright dived over the side, extricated him, and they were hauled on board. The shipwright was later recommended for a gold life-saving medal and gratuity.

The engine room had continual trouble with feed pumps, and during the last 24 hours before getting into port only one feed pump was in commission. During the last few days of the trip the phosphorescence was beautiful, the water along the sides of the ship for 50 feet or more away seemed as though illuminated by cargo lights, and the wake of the ship could be followed for miles. Porpoises, going through the water gave the effect of a torpedo.

September 18, 8.30 a. m., sighted four destroyers on port beam. They joined the convoy as escort, and at 9.30 a. m. *Huntington* left, heading west. At 9.50 a. m. the same day the *Duncan* and *McCall* left convoy, heading west. The morning of September 19 was foggy, with a strong wind blowing. Our radio picked up S. O. S. from a ship that was being shelled by an enemy submarine. It was later learned that this submarine had sunk a French patrol boat about 5,000 yards from us on our lee side, all hands being lost. Had the day been clear, one of the convoy might have been sunk. At 6.25 p. m. on the 19th sighted Souzan Light, and at 8.38 anchored off Belle Isle. Under way at daybreak September 20, and at 6 p. m. entered lock at St. Nazaire to go into the basin. The streets and docks were packed with an enthusiastic crowd of French and Americans. The

troops aboard were wild with enthusiasm. The band played the Star Spangled Banner and the Marseillaise as the ship passed through the lock. At 7.30 p. m. moored in basin. Troops were disembarked the next day and five patients (Army) transferred to Base Hospital No. 101. Repairs to engines kept us in port eight days. A number of the officers, including the writer, took advantage of this delay to visit Paris.

On September 29 at 5 a. m. all the ships of the convoy started on the return voyage escorted by destroyers for 48 hours, after which they kept in formation until after passing longitude 30°, when it was each for himself. When the signal was given for the convoy to break up the *Huron* immediately forged ahead and led the convoy, but within a few hours had dropped behind all the other ships and was the last to arrive in Hoboken. On the return trip a naval ensign and an American boy living in Paris, but who had an appointment to the United States Naval Academy, were passengers. All the medical officers stood a "lookout" watch on the flying bridge on the west-bound trip.

The *Pocahontas* arrived at Hoboken at 7 p. m., October 9. Many things that occurred on this trip and could have been fraught with serious consequences, now, in retrospect, seem very humorous, and the original members of the wardroom mess, who are still on the ship, often discuss the events and problems of that first trip.

After extensive repairs at the Morse Dry Dock Co.'s plant, where, among other things, a heating system and battle lights were installed, we returned to Hoboken, November 6, for provisions and coal preparatory to another trip.

On November 13, 2,383 officers and men of the Fifteenth Infantry, New York National Guard (colored), commanded by Col. "Bill" Hayward, embarked. This regiment had five negro officers, including Lieut. "Jim" Europe, band leader. Lieut. Europe was killed in a theater in Boston during a concert in May, 1919, by one of his bandsmen whom he had reprimanded.

At 8.30 p. m., under way, escorted by the U. S. S. *San Diego* and the destroyers *Rowe* and *Monaghan*. The ships of the convoy were *Pocahontas*, *Madawaska*, and *Powhatan*. On November 13, due to the bending of the piston rod and breaking of the slide valve of the starboard low-pressure cylinder, the ship returned to port, arriving at Hoboken at 2 p. m., November 14. The troops remained on board until 11 a. m. of the 16th. On the 15th Fred A. Russel, bugler, Fifteenth Infantry, of New York National Guard, while attempting to demonstrate the use of a Colt automatic .45, in upper No. 6 hold, shot himself through the head. He was immediately sent to St. Mary's Hospital, Hoboken, where he died several days later.

The piston rod and slide valve were repaired and preparations again undertaken for going to sea. The Fifteenth New York was reassigned to us and scheduled to embark December 3. At 2 p. m., December 1, a bunker fire was discovered through a fireman's leaning against the bulkhead and finding it hot, in No. 2 athwartship bunker. We were not permitted to go to sea and immediately commenced discharging the coal from this bunker, 760 tons in all. Had we been permitted to proceed to sea this bunker could have been emptied first for steaming and cleared in about five days.

Troops embarked on December 3, as scheduled, before all the coal was discharged. We missed our convoy and had to wait for the next one on December 12. No liberty was granted anyone after the fire was discovered on December 1. Incidentally there was no liberty for Navy personnel from November 30, 1917, till January 1, 1918.

A rather funny incident happened when the Fifteenth New York were aboard in November, the facts about it being obtained in a roundabout way and by piecemeal at intervals during the following two months. It appears that a certain officer of the Fifteenth New York came aboard in November feeling quite exhilarated, so after turning in (he had a lower berth) he commenced pushing with his feet against the upper bunk (occupied by a brother officer) which carried away and fell on him. The officer who had occupied the upper bunk then did a little jumping up and down on his own account, the bed springs bruising up his neighbor considerably. After our return for repairs the bruised officer reached home considerably plastered up with adhesive and told his wife he had started to France but there had been an explosion on the ship, necessitating its return to port for repairs, and that he was injured in this explosion. Incidentally, this officer fell down a flight of steps between our return on November 14 and our departure in December, and broke his leg, so did not make the trip with us.

At 3.15 p. m., on December 12, left the pier at Hoboken and anchored in Gravesend Bay to wait for the rest of the convoy. On the 13th a storm was threatening (barometer at noon was 30.24). During the afternoon the barometer was falling rapidly. The pilot informed the captain that if he wished to get out that day it would be wise to sail before nightfall, but it was necessary to await orders from the convoy commander. At 8 p. m. under way (barometer 29.78); at 8.30 p. m. weather became thick and a blinding snowstorm set in, the wind blowing a gale. The weather was too thick to proceed with safety, so at 9 p. m. anchored about $3\frac{1}{2}$ miles north (true) of northern entrance to Ambrose Channel; no landmarks visible. At 9.10 p. m. battle watch set; 2 a. m. barometer 29.06, a fall of 1.18 inches in 14 hours. At 2.30 a. m. (14th) let go starboard anchor;

at 2.35 a. m. British tank steamer *San Tirso*, dragging anchor, struck us on starboard bow at after end of forecastle, making a large hole from forecastle deck down to well deck, then swung alongside, where she remained till 6 a. m., when she got under way, smashing No. 9 lifeboat in getting away from the side. At daybreak work was started cutting away débris around the hole in the side. Then it was shored up both inboard and outboard with timbers bolted together, and the intervening space filled in with reinforced concrete. We made the round trip with this patch in place. When we were struck, a sailor was thrown from No. 1 hatch down into No. 1 hold. His ankle was badly sprained and he was rendered semiconscious. There was a partial stampede of troops, and the first thing he remembers was being stepped on by the troops trying to get out of the hold. He did not mind his ankle being sprained but was "peevish" at being run over by troops. One Army officer informed me the next day that he was very tired, as he had been up ever since the "collision."

At 8 p. m., December 14, got under way, escorted by the U. S. S. *North Carolina* and the destroyers *Rowe* and *Monaghan*. The ships of the convoy were the *Pocahontas*, *President Lincoln*, *Covington*, *Henderson*, *De Kalb*, *Susquehanna*, and *Antigone*.

Target practice was held on December 20 and 21. During our stay in port blue standing lights had been installed in troop holds, galleys, pantries, crew's quarters, and passages. All other lights were out from sunset to sunrise—at this season of the year from about 4.25 p. m. to 7 a. m., or later. Shortly after "lights out" of an evening the troops (colored) usually had "bayonet practice." It was almost a nightly occurrence to have several bayonet wounds to dress. On one occasion I dressed a severe incised wound of the wrist. Upon inquiry as to how it happened I was informed by the victim that he and another soldier had an argument as to which could draw his knife the quickest; they made a bet of \$5, put their knives in their pockets, and at a given signal proceeded to "draw." The one with the wound naturally lost the bet, and both were satisfied.

Picked up destroyer convoy (seven destroyers) morning of December 24, and at 11.15 a. m. the U. S. S. *North Carolina* left convoy, heading west. There were several cases of lobar pneumonia on this trip, one case being a West Indian negro who prior to joining the Fifteenth New York had been employed on mule transports. He was on a ship sunk in the North Sea by an enemy torpedo, and in May, 1917, was on a ship sunk by gunfire from an enemy submarine just outside of Belle Isle. He was extremely ill, but, needless to say, recovered and probably went through the war without a scratch, if his usual luck held good.

At 3.50 p. m., December 26, convoy separated, *Susquehanna*, *Henderson*, *Antigone*, and *De Kalb*, with three destroyers, heading for

St. Nazaire, the *Pocahontas*, *President Lincoln*, and *Covington*, with four destroyers, heading for Brest. December 27, 9.05 a. m., sighted land; 9.20 picked up two airplanes on starboard bow; at 12.34 p. m. anchored in Brest Harbor. December 28, 4 p. m., 11 Army patients transferred to Naval Base Hospital No. 1.

January 1, 1918, 7.10 a. m., troops disembarked and sent to St. Nazaire by rail in cars whose rated capacity was "40 hommes, 8 cheveaux." January 2, 1918, 8.14 a. m., under way, and at 9.22 a. m. secured to dock, Port du Commerce, and commenced discharging cargo. Repairs to engines were going on while in port.

January 9, 8.40 a. m., M. R., seaman, second class, died from lobar pneumonia; remains embalmed and returned to the United States.

At 11.20 a. m. officers and crew mustered at quarters and assembled on after "A" deck. Commander J. F. Hellweg read bureau orders detaching him from command of the *Pocahontas*, and Commander D. M. Wood, United States Navy, assumed command. The captain's writer had been instructed to prepare all necessary papers for turning over the command. An "old-time" yeoman told him to prepare, among other things, a receipt for "one ship and equipage," which he did, and he procured Commander Wood's signature for it.

At 4.35 p. m. Commander Hellweg left the ship, attended at the gangway by every officer on the ship. He went to command the U. S. S. *Marietta*, on the Mediterranean station; he joined her in Gibraltar, going there by the way of Spain.

January 17, 8.05 a. m., cast off from deck and got under way in company with *President Lincoln* and *Covington*, and escorted by four destroyers. At 5.05 p. m. darkened ship and set battle watches.

At 12 m., January 17, barometer, which had been comparatively steady for several days, started down from 29.95 by jumps, until it reached the minimum for the trip of 28.40 at 10 a. m., January 19, remained steady till noon, when it went to 28.41 and reached 29 at 2 a. m. on the 21st; then stayed below 29.50 until 5 a. m. on the 23d; reached 29.96 at 11 a. m. on the 25th; error not known.

January 18, 2 p. m., destroyers left convoy and headed east; weather became rough and continued so for several days. January 21, sharp lightning continuously throughout first watch; variable winds and heavy rain squalls during midwatch (Jan. 22); hail throughout forenoon watch; mess bench washed overboard; 1.10 p. m. No. 1 lookout station on forecastle peak carried away. January 26, ship rolling 30° during afternoon watch.

January 25, picked up distress message from American steamer *City of Wilmington* and headed south. Fell in with her 5.10 a. m. the 27th, and by 8 a. m. had secured tow line to her. From this time on we towed her at intervals, but most of the time were standing by,

repairing lines, and trying to get them to her. At 5.17 p. m. January 31, finally got a line to her that held until we reached Bermuda. At 5.30 a. m. February 1, revenue cutter *Seminole*, and on February 5, U. S. S. *Mars*, joined us and stood by until we reached St. George, Bermuda, at 6.46 p. m., February 6. February 7, 9.51 a. m., under way for dock yard. Pratique granted 11.45 a. m., and at 2 p. m. moored in dock yard outboard of U. S. S. *Mars*.

February 8, coaling ship. The writer visited the Royal Naval Hospital. Two United States Navy patients were received the next day from this hospital for transfer to the United States.

February 9, at 10 a. m., under way and swung ship that afternoon. Arrived Newport News 3.15 p. m., February 11. Coaled ship.

February 14, 9.15 p. m., Commander E. C. Kalbfus, United States Navy, reported on board, and at 5 p. m. the next day assumed command of the ship, Commander Wood leaving the ship at 5.15 p. m.

February 16, 11 a. m., under way for New York, arriving at Hoboken at 2.30 p. m. on the 17th. Went to navy yard berth No. 13 at 4.30 p. m. the next day for three weeks' overhaul. The sanitary flushing system was overhauled and put in excellent condition during the stay and has since been eminently satisfactory, and the system was changed from the continuous flow to a periodic flush every two minutes. The wooden standees were taken out of No. 3 hold and folding iron standees with canvas bottoms were installed. Twenty "ever-warm" life suits were delivered to the supply officer for the use of patients.

At 4.45 p. m., March 11, went to Pier No. 1, Hoboken, and on March 14, 2,405 officers and troops of the following organizations embarked: Sixteenth United States Engineers, Three hundred and fourteenth Field Artillery, and March replacement draft.

Under way from Hoboken at 5.15 p. m., the same day, and anchored at Gravesend Bay at 8.16 p. m. Port high-pressure cylinder out of commission and ship's force working on it; repaired at 11.56; under way, escorted by the U. S. S. *Rochester* and accompanied by *Henderson*, *Aeolus*, *Henry C. Mallory*, and *Matsonia*. Midnight, darkened ship and set battle watches. On the night of March 16 *Mallory* and *Aeolus* got lost from convoy but fell in with us at 5.30 a. m. the 17th. March 18 held target practice.

March 19, 6.10 a. m., J. B. H., private, first class, Three hundred and fourteenth Field Artillery, died of lobar pneumonia. On the night of the 21st *Matsonia* signaled over to know if we could spare any diphtheria antitoxin, and at 8.17 a. m. of the 22d sent boat for 130,000 units. At 5.10 p. m., March 23, C. F., private, March replacement draft, died of lobar pneumonia. Both bodies embalmed

and returned to the United States. At 8 p. m., March 25, W. D. (colored), private, Third Company, March replacement draft, died of cerebro-spinal meningitis. The ship's embalmer being ill, the body was not embalmed, but was buried in the American Cemetery, St. Nazaire, No. 21, plot B, grave 52, on March 27, 1918.

At 6.50 a. m., destroyer escort joined convoy and at 7.30 a. m. *Rochester* left, heading west. At 10.20 a. m., March 26, anchored in river below St. Nazaire; 5.30 p. m. entered lock and at 6.50 p. m. secured to dock. At 6.55 a. m., March 27, troops commenced to disembark and at 9 a. m. 19 Army patients were transferred to Base Hospital No. 101.

March 29, 34 Army patients embarked for transportation to United States, and at 4.10 p. m. the same day got under way with convoy and escort of three destroyers for return trip. At 9.05 p. m. set battle watches. March 30 at 6.15 p. m. destroyer escort left convoy, headed east.

On April 2, had a severe storm about 11.30 p. m., the barometer going from 29 at 7 p. m. to 29.66 at midnight, reaching 30.22 at noon the next day (3d). Nineteen tubercular patients, 1 officer, 3 nurses, and 15 enlisted men were sleeping on lee side of B deck on cots. The nurses and officer got below before the storm broke, the officer's cot, mattress, and bedding going overboard. Frank Oboshaw, private (an Indian), was found hanging on by the outboard fire plug, his cot having broken adrift.

At 11.50 a. m., April 5, sighted convoy of eight ships going east and bearing 350°. At 12 m. made recognition signals to cruiser of eastbound convoy. At 12.20 p. m. cruiser *Frederick*, due to mistaking our signals, fired shot across our bow and stood over toward us. Slowed to one-third speed, and at 1.10 p. m. proceeded on our course, 296 p. s. c. Arrived Hoboken, Pier No. 2, April 9, at 8.30 a. m.

Thirty-four Army patients transferred to receiving hospital, Ellis Island, and remains of Hewett and Frommeyer delivered to effect's quartermaster. Coaled ship, received stores, and on April 15, 2,426 officers and troops of the Sixty-first Infantry embarked.

At 10.48 a. m., April 16, escorted by U. S. S. *Seattle* and accompanied by *Calamares*, *Madawaska*, *Maul*, *Mount Vernon*, *El Oriente*, *Czar*, and *Czarita*, sailed for France. April 23 target practice.

April 26, at 6.23 a. m., sighted destroyer escort (12 destroyers), and at 8.08 a. m. *Seattle* left convoy.

At 5.35 a. m. destroyer *Roe* sounded submarine warning (six blasts on whistle), and at 5.45 *Calamares* broke out submarine warning flag denoting submarine to port. At 6.35 resumed course.

At 12.30 a. m., April 28, destroyer on port bow gave submarine warning. The *Pocahontas* received several severe jars as though passing over some submerged object, but it was never determined whether

this was an enemy submarine, some submerged wreckage, or the discharge of depth bombs.

At 10.55 a. m. secured to dock in Port du Commerce, Brest, and troops immediately disembarked. Twelve Army patients sent to United States Navy Base Hospital No. 1, one patient (lobar pneumonia), too ill to move, was kept on board and was convalescent by the time we reached the United States.

At 5.30 p. m., April 29, under way for the United States, after a stay of 29 hours in port, escorted by two destroyers and one patrol boat. At 6.50 p. m., April 30, escort left the convoy and headed east.

At 10.20 a. m., on May 2, while steaming alone, a large enemy submarine came to the surface about 7,000 yards on our starboard quarter and opened fire on us with both guns. The commanding officer took the deck, ordered full speed ahead under forced draft, and immediately commenced to zigzag. Crew went to battle stations; opened fire with No. 5 and No. 6 guns at range of 6,000 yards, raised it immediately to 8,000 yards, then to extreme elevation, but all shots fell short. No. 1 and No. 2 guns were fired when they could be brought to bear on the submarine, but at extreme elevation all shots from all guns fell short. Enemy shells commenced to fall all around the ship at 10.30 a. m. and exploded on contact, many fragments falling on board. Several pieces of enemy shell base were obtained, from the measurements of which a curve was plotted and the bore of the guns was determined to be 4.7. Several members of the crew had a fight on "C" deck during the battle over the possession of a particularly large fragment of shrapnel. The *Pocahontas* fired the last shot at 11.20 a. m.; it fell 3,000 yards short. The fact that the ship escaped was due entirely to the sound judgment and excellent seamanship of Captain Kalbfus. The number of shots fired by the enemy was 31; by the *Pocahontas* 49. We were well outside of the so-called war zone, and this cruiser was possibly on its way to the American coast and one of the first to arrive there. The rest of the trip was without incident, and we reached Newport News at 8 p. m., May 8. Coaled ship and took provisions. Obtained new powder and sharp-nose shells.

May 17 embarked 2,369 officers and men of the One hundred and second Engineers, commanded by Col. Cornelius Vanderbilt, and at 3.58 p. m. got under way to Hampton Roads, where we anchored at 4.47 p. m. A board of ordnance officers came aboard to test our guns the next day (18th) in order to determine why they did not have a greater range on May 2. At 8.53 a. m., of the 18th, under way, but weather foggy and could not test guns. Board left the ship. Reached Cape Henry sea buoy at noon and lay to awaiting convoy until 7.55 p. m., when we anchored off Buoy 2, C. B.

At 10.45 p. m., under way, escorted by the U. S. S. *Huntington* and destroyers *Kiberly* and *Winslow* and in company with *Susquehanna*, *Madawaska*, *Bridge*, *Zeelandia*, *Finland*, *President Grant*, *Calamares*, *El Occidente*, *Rè d'Italia*, *Duca d'Aosta*, and *Duca d'Abruzzi*. On May 19 picked up S. O. S. from steamer *Nyanza* that she was being shelled and chased by raider. Her position was 200 miles distant, bearing 78° (true) from our position.

At 10.45 a. m. sighted an eastbound convoy of 28 ships.

May 22, 12 m., *Zeelandia* lost a man overboard.

May 25, 10.40 p. m., Charles G. Crawford, seaman, second class, while climbing to lookout station on searchlight platform, with a handful of sandwiches, fell about 20 feet, fractured right femur and left first metatarsal bone.

May 26, 3.50 p. m., sighted an object ahead. All ships in convoy went to battle quarters and several opened fire. Our course eventually brought the object on our starboard bow, about 30 yards away. No. 1 gun fired six shots. *Huntington* and *Madawaska* firing almost directly at us, their shells, bursting on contact, splashed water on our forecastle, until the *Pocahontas* broke out the "cease-firing" signal. The object proved to be an overturned clinker-built lifeboat. The only hit made was by the *Pocahontas* starboard 1-pounder.

May 28, 3.20 p. m., escort of six destroyers joined the convoy, and at 3.55 p. m. *Huntington* left, heading west.

May 28, 5.05 p. m., *Calamares* hoisted submarine warning flag, and a destroyer dropped several depth bombs.

May 29, 4 p. m., *Duca d'Abruzzi* took a bad sheer to right, nearly ramming *Pocahontas*.

May 30, 1.55 p. m., sighted two hydroplanes. At 2.15 p. m., sighted land. At 2.35 p. m., port submarine warning flag shown in convoy. All ships in convoy fired at intervals, and several depth charges were dropped by destroyers. At 10.45 p. m., entered locks at St. Nazaire, France, and, at 11.50 p. m., secured to dock.

During the trip Col. Vanderbilt entertained those of us at the captain's table with reminiscences of his acquaintance with the Kaiser and Crown Prince, and spoke of having met, on a number of occasions, the Princess Irene, sister of the Kaiser.

At 6.20 a. m., May 31, troops disembarked; one Army and one Navy patient (Crawford) transferred to Base Hospital No. 101.

June 1, 9.25 a. m., 83 Army patients and 7 general court-martial prisoners embarked for transportation to the United States.

At 5.30 a. m., June 2, under way; 11 a. m., anchored in Quiberon Bay to wait for convoy.

June 5, "abandon ship" drill; lowered all lifeboats and pulled away from side. At 4.17 p. m., got under way and battle watches set.

June 7, 3.10 a. m., escort left convoy and headed north.

June 9, 4.50 a. m., Louis W. Leonhardt, private, Fourth Provisional Recruiting Battalion, a patient, escaped from his guards, jumped overboard, and was lost.

At 12.44, June 11, sighted a spar bearing 30° and fired two shots at it from No. 1 and No. 5 guns.

June 16, 12.05 p. m., arrived at Newport News and immediately transferred 76 Army patients to Embarkation Hospital and 6 Navy and United States Marine Corps patients to the United States Naval Hospital, Norfolk, Va.

June 17, Hugh St. Elmo Croft, fireman, second class, of our crew, was drowned at Ocean View at 1.10 p. m., while swimming. The body was recovered and forwarded to next of kin through the naval hospital at Naval Training Base.

June 21, 8 to 11 p. m., troops embarking.

June 22, 8.30 a. m., troops embarking. At 6.24 p. m., got under way. At 7.27 p. m., anchored in Hampton Roads.

June 23, 6.12 a. m., got under way, having 2,661 officers and troops of the One hundred and forty-seventh Infantry and One hundred and twelfth Ohio Engineers on board, escorted by the U. S. S. *South Dakota* and destroyer *Gregory*, the following ships being in the convoy: *Pocahontas*, *Calamares*, *Bridge*, *Susquehanna*, *Re d'Italia*, *Duca d'Aosta*, *Patria*, *Duca d'Abruzzi*, *Napotin*, and *Robert E. Lee*.

June 25, intercepted S O S, *Khiva* being chased and shelled by raider; position, 40° 57' N., 61° 1' W.

July 3, 5.50 p. m., destroyer escort joined convoy. At 6.04 p. m., *South Dakota* left, heading west.

July 5, 10 a. m., sighted land. At 11.51, anchored in harbor at Brest. At 2.20 p. m., secured to dock, Port du Commerce. At 4.06 p. m., troops disembarked.

At 9.10 a. m., July 6, Capt. R. T. Murdock, former master of the Canadian schooner *Rothsay*, reported aboard for passage to the United States. At 2 p. m., draft of 50 men from Base No. 7, nucleus crew No. 35, and 3 general court-martial prisoners received for transportation to United States.

July 7, nine patients received from Navy Base Hospital No. 5 for transfer to the United States.

July 8, 10 a. m., received from Base Hospital No. 1, 49 Army patients and 1 attendant for transfer to the United States. At 7.04 p. m., under way with convoy and escort of 6 destroyers. Set clocks back 1 hour and at 4.40 p. m. set battle watches.

July 9, 9.55 a. m., destroyer on starboard side fired shot, hoisted starboard submarine warning, and dropped several depth charges.

July 10, 8.30 p. m., destroyer escort left convoy and headed east.

July 12, 1.50 a. m., passed Red Cross steamer close aboard on starboard side. She was illuminated with large red lights in the form of crosses on bow, sides, and stern.

July 16, 11.05 a. m., passed red buoy marked "1." This same buoy was seen again on our next westbound trip on the afternoon of August 15 about 100 miles from its location on July 16.

July 19, 5 p. m., Cape Charles lightship abeam. At 8.10 p. m., reached Newport News, Va.

July 20, 11.20 a. m., docked. At 11.30 a. m., commanding officer personally destroyed secret orders by burning. Transferred Army patients to Embarkation Hospital; Navy and United States Marine Corps patients to United States Naval Hospital, Norfolk, Va.

Ship camouflaged while in port, and wooden standees replaced by iron ones, some folding, others stationary. Upper No. 2 hold, which had formerly been used as a mess room, is now equipped with folding standees.

July 26, 2,784 officers and men of the Three hundred and fourteenth, Three hundred and thirty-second, and Three hundred and thirty-fifth Labor Battalions embarked. At 11.15 a. m., got under way, escorted by the U. S. S. *Huntington* and destroyers *Little* and *Connor* and accompanied by the *Bridge*, *Henderson*, *Susquehanna*, *Kroonland*, *Finland*, *Sobral*, *Casieta*, *Duca d'Aosta*, *Ulua*, and *Tasmania* (the latter a British transport with Australian troops).

July 29, 11.17 p. m. (Greenwich mean time) *Duca d'Aosta* lost soldier overboard; made "man overboard" signal and let go four life buoys, one of them luminous. Man was not seen after falling overboard.

August 3, 3.20 a. m., Jethro McMahon, private, Company B, Three hundred and thirty-fifth Labor Battalion, died of tuberculosis, acute miliary, pulmonary. Body embalmed and returned to the United States.

August 4, 6.23 a. m., sighted destroyer escort. *Huntington* departed headed west.

August 6, 3.55 p. m., anchored in Brest Harbor.

August 7, 9.20 a. m., troops disembarked on lighters. At 10.30 a. m., 49 patients, Army, transferred to hospital, port of debarkation.

August 8, 11 a. m., received 32 Army and 8 United States Marine Corps patients for transportation to the United States, also 50 Army officers and 75 enlisted men for transportation to the United States. Emile de Mueder, warrant officer, French Navy, pilot, and Lieut. Monterio Gomes, of the Portuguese Army, reported on board for transportation to the United States. At 4.40 p. m., got under way with convoy and escort.

August 9, destroyer bearing 300° commenced to drop depth charges and dropped a total of 24.

August 15, 4.30 p. m., sighted the same buoy seen on July 16, and held target practice, using buoy for target.

August 18, 4.17 p. m., moored to Pier No. 16, Hoboken, and patients transferred to the hospital, port of embarkation.

August 19, proceeded to Morse Dry Dock plant for three weeks' repairs. A ventilating system that had been authorized by C. & R. letter O-TPX-3, dated December 14, 1917, was partially installed during repair period and was completed about eight months later. Up to this time there had been no ventilating system in troop holds or crew's quarters except by wind sails.

Upon the completion of repairs the ship returned to Hoboken on September 11 and prepared to embark troops. The writer of these notes was transferred to the United States Naval Hospital, Washington, D. C., on September 15, the date of the beginning of the next trip, and returned on board October 16.

The trip beginning on September 15 was in many respects the most eventful the ship made. Sailed at 2.15 p. m., with 111 officers and 2,808 troops of the following organizations: Three hundred and seventy-fourth August Replacement Draft; First, Second, Twentieth, Twenty-first, Twenty-fifth, Three hundred and seventy-first, Three hundred and seventy-second, and Three hundred and Seventy-third Casual Companies; Nos. 41 and 44, Medical Replacement Units; First and Second Quartermaster Corps units; and Eight hundred and thirteenth Infantry, Ordnance detachments. The convoy was escorted by the U. S. S. *Pueblo* and the destroyers *Stribling* and *Stringham*. The following ships made up the convoy: *Pocahontas*, *Calamares*, *Ulia*, *Powhatan*, *Martha Washington*, *Henderson*, *Finland*, *Aeolus*, *Matsonia*, *Patria*, *Koningin der Nederlanden* and *H. M. S. Kursk*.

September 17, 3 p. m., port condenser out of commission; going ahead on starboard engine. At 6.50 p. m., repairs completed and going ahead under both engines.

September 19, 4.53 p. m., U. S. S. *New Hampshire* broke out port submarine warning flag.

September 24, 2.20 p. m., *Nederlanden* reports hearing gunfire bearing 100° (true); no action taken.

September 25, 5.35 p. m., picked up destroyer escort. At 6.42 p. m., U. S. S. *Pueblo* left convoy headed west. No record of when U. S. S. *New Hampshire* left.

September 27, water very phosphorescent, the wakes of a number of porpoises distinctly seen.

This was just about the time the influenza epidemic was prevalent in the Eastern States, and the *Pocahontas* did not escape. One case was admitted the day the troops embarked, and several were added daily until the seventh day, when 76 cases were admitted; on the eighth day, 57 cases, and by the thirteenth day, when the vessel arrived in Brest, a total of 307 cases had been admitted. Many mild cases were not taken up on the sick list at all. Only three deaths had occurred up to the time of arrival in port at noon on the 28th; one on September 27 and two on the 28th, and two occurred on the 28th after arrival in port. The 2,000 troops disembarked immediately after arrival, but owing to the fact that lighters were not available, about 1,000 remained aboard until September 30, when they were disembarked, with the exception of 29 who were too ill to go ashore with their command, and the hospital boat was not available for their transfer. On the afternoon of September 29, 154 Army patients were transferred to United States Naval Base Hospital No. 1. Six deaths occurred on September 30, one being a naval aviator (passenger). During the epidemic, No. 7 hold was cleared of troops and used as a sick bay, the sickest patients being put on cots on "B" deck. The Army seemed demoralized to a certain extent and save for a few exceptions very little assistance was given to the naval medical department by the Army medical personnel.

All the ship's officers, line, pay, and medical, helped care for the sick. A pay officer on more than one occasion gave enemas to patients and assisted in many other ways.

In the meantime the Navy personnel itself had not escaped, 81 cases of influenza, 1 of diphtheria, and 1 of lobar pneumonia having developed, but with only one death up to this time (the aviation passenger, as noted above).

The ship sailed on the return voyage at 12.10 p. m. October 1 with convoy and escort.

October 9 there were extraordinary electrical disturbances from midnight to 12.30 a. m., practically continuous flashes of lightning continuing until 2.30 a. m., accompanied by heavy rain.

There were on board the 29 patients above referred to, who were too ill to go with their command, and one Army medical officer and several Army hospital corpsmen, who were not disembarked. This officer, Lieut. Hardesty, did excellent work on the return trip, as he also did going east.

Destroyer escort left convoy at dusk on October 2. Of the 29 patients remaining aboard, 9 died en route home and the other 20 were transferred to the hospital at Ellis Island on October 12.

On the return trip the following cases developed among the Navy personnel: Lobar pneumonia, 4; scarlet fever, 1; influenza, 11; with

3 deaths, bringing the total up to Army 19, Navy 4. The 23 bodies were embalmed and returned to the United States. After inspecting these remains at Hoboken, the Army authorities reported that they were in better condition than those from any other ship of the transport fleet. The ship's licensed embalmer at this time was at the Hospital Corps Training School at Hampton Roads, and all the embalming was done by T. L. Garrigan, pharmacist's mate, first class, United States Navy.

Arrived at Hoboken at 11.20 a. m. October 12. The writer rejoined the ship there on October 16.

On October 21 at 12 m. sailed for France with 2,408 United States Marines, and 15 officers of the Seventh and Eighth Separate Battalions United States Marine Corps, 40 Army officers, 6 Navy officers, and 4 naval enlisted men as passengers. The convoy was made up of the following ships: *Pocahontas*, *Aeolus*, *Martha Washington*, *Madawaska*, *Sobral*, *Comfort*, and *Duca d'Aosta* and was escorted by the U. S. S. *New Hampshire*, U. S. S. *Charleston*, and the destroyer *Radford*.

The number of troops was purposely reduced on account of the possibility of there being another outbreak of influenza. No troops were put in No. 7 hold, which was reserved for a sick bay. During the trip 201 cases of influenza developed among the Marines, as follows: Three on the third day, 21 on the fourth day, 8 on the fifth day, 10 on the sixth day, 25 on the seventh day, 38 on the eighth day, 41 on the ninth day, and 55 during the next five days. Only 2 cases developed among the Navy personnel, 1 on the eighth day and 1 on the tenth day. There were no deaths.

October 31, 5.22 p. m., sighted destroyer escort; also four west-bound steamers. At 6 p. m. destroyers joined convoy and U. S. S. *Charleston* left, heading west. No record can be found of the time the *New Hampshire* left the convoy.

Arrived at Brest at 11.15 a. m. November 3, and at 3 p. m. all troops had disembarked. Eighty-six cases of influenza were transferred to the hospital, port of debarkation.

November 6, 8.10 p. m., Jean Lenzo, Belgium orphan, who tried to stow away for transportation to the United States, was sent ashore and placed in custody of the beachmaster.

Sailed for the United States at 3.02 p. m., November 7, 1918, having as a passenger Capitaine de Vaisseau de Saint-Seine, of the French Navy, for duty as naval attaché at Washington. The following patients were embarked: Navy, 1 officer, 7 enlisted men, and 6 United States Marine Corps; Army, 16 officers, 8 nurses and 1 attendant, and 136 enlisted men.

There were two deaths on the return trip, John W. Bennett, private, Company A, Fourth Machine Gun Battalion, on November

12, of pulmonary embolus, following mastoid operation with thrombosis of lateral sinus and jugular vein, and Second Lieut. Frank R. Bronson, Quartermaster Corps, United States Army, on November 15, of chronic valvular heart disease. This officer was classed on the passenger list as an "ambulatory surgical" case, but was immediately discovered and put to bed in the sick bay.

November 7, 10 p. m., picked up S. O. S. from a ship being shelled about 10 miles distant. Destroyer escort went to rescue and convoy continued unescorted.

November 8, during dogwatches, heavy swells and ship pitched heavily.

At 5 p. m., Monday, November 11, "all hands" were called to quarters and assembled on the lee side of "B" deck. The executive officer, in the presence of the captain and all the ship's officers, published Alnav message No. 173, as follows: "Armistice signed at 5 a. m. November 11; hostilities cease at 11 a. m. G. M. T. 13011 sgd Secnav." There was wild enthusiasm. That night and the following night screen lights were allowed. On the night of the 13th authority was granted by an Alnav message to have lights throughout the ship and for a short while every light on the ship was turned on.

At 10 a. m., on November 12, there was a celebration by the crew, a parade around "A" deck with music furnished by sailors using dish pans, buckets, and various other noise-producing articles.

On November 15, at 12 m., received S. O. S. from U. S. S. *Manta*, asking for a tow on account of disabled engines. Picked her up at 9 p. m. the same day and stood by until next morning (16th), when we got a line to her at 8 a. m. Line parted at 9.15 a. m.; got a line to her again at 1.14 p. m., and towed her until 9 p. m. on the 17th, when she was taken in tow by a tug, U. S. S. *Avocet*, which came out from Boston.

Arrived at Newport News at 11.25 a. m., November 20; disembarked patients and passengers, and at 11 a. m., November 22, sailed for New York with 43 officers and 1,775 men of the Thirty-seventh Regiment Coast Artillery Corps, United States Army. Many of our liberty party were left ashore, some of whom joined us in Hoboken on the 23d, the remainder upon our return to Newport News. The writer got aboard just as the gangway was being rigged in.

Arrived New York at 12 m. on the 23d amid wild enthusiasm from the harbor craft, ferryboats, and factories on the shore, everyone taking these to be the first troops to arrive from France. Troops disembarked at 3 p. m. (23d), and 8 a. m. November 24, 138 officers and 2,800 enlisted men of the Twelfth Regiment, Infantry, United States Army, embarked. At 3.15 p. m. under way, and arrived at Newport News at 7.16 p. m. November 25.

At 9 p. m. Commander John Downes, United States Navy, reported as the relief of Captain E. C. Kalbfus, United States Navy. Secured to C. & O. No. 4 pier at midnight. Troops and seven Army patients immediately disembarked.

At 7 a. m. November 26 went to coaling piers, Lamberts Point, Va., where photographs were made of the ship, crew, and officers.

November 27, Commander John Downes assumed command of the *Pocahontas*, Captain Kalbfus being detached to command the U. S. S. *Iowa*.

After coaling and taking on cargo, sailed for Hoboken, December 4. A seaplane that escorted us to sea was wrecked on the way back to port and we headed in her direction to render assistance, but she was picked up and towed by another vessel before we could reach her. Arrived at Hoboken on the 5th to take on Christmas mail for the American Expeditionary Forces.

One hundred Army nurses reported aboard December 8 for passage to France, and at 12 m. the same day sailed.

December 11, severe snowstorm during afternoon watch, so thick that it was necessary to blow fog whistles.

December 18, thick weather during afternoon watch. At 5.09 p. m. anchored in harbor of La Rochelle after much difficulty in finding anchorage, due to thick weather and strong west wind.

December 19, 8.50 a. m., under way. At 2.24 p. m., anchored in Gironde River, off Pointe de Grave. There was a strong flood tide running and a gale blowing; the ship became unmanageable, and it was only due to the excellent seamanship of the commanding officer that considerable and serious damage was not done to the *Pocahontas* and other ships.

December 20, 3.48 a. m., under way, and at 8.30 a. m. moored at Bassens. At 2.10 p. m., Army nurses disembarked. Two medical officers reported from Base Hospital No. 5, Brest, for temporary duty and transportation to the United States.

December 23, 2,869 troops and officers of the One hundred and twentieth-sixth Field Artillery and One hundred and ninth Ammunition Train and 1 officer and 44 enlisted men of the Navy embarked, and patients as follows: Navy, 1 from air station at Pauillac; Army, 8 officers and 30 enlisted men from Base Hospital No. 22.

At 8 a. m., on the 24th, under way and anchored at La Verdon at 12 m. At 8 p. m., had Christmas tree and celebration in ward-room for Army and Navy officers.

December 25, Christmas Day, 9.30 a. m., under way for the United States. Christmas celebration for the crew and troops at 2 p. m., presents being distributed to every man on board by the Y. M. C. A., Red Cross, and K. of C.

December 31, 1918, smoker and celebration, music, reading, boxing, etc., in the wardroom from 8 p. m. to midnight. At midnight 16 bells were struck and the ship's band and two troop bands played the national anthem.

Arrived at Newport News at 8.17 p. m., January 4, 1919, going to dock at 7.35 a. m. the next day and immediately disembarked troops, patients embarked in France, and 21 admitted during the trip.

At 4.37 p. m., January 6, sailed for navy yard, Philadelphia, for two weeks' repairs and docking.

Upon completion of repairs the ship sailed for France at 12.15 p. m., January 21, 1919.

On February 1 passed Isle de Yeu, where *Tenedores* was aground, and at 3.15 anchored off Pointe de Grave, Gironde River. At 3.50 a. m., February 3, under way, arriving at Bordeaux (Bassens) at 7.49 a. m.

At 10 a. m., February 5, 1 officer and 24 men (sick and wounded) received from Base Hospital No. 20, for transportation to the United States. The same day 111 officers and 2,794 men of the Sixty-second Coast Artillery Corps, United States Army, formerly California National Guard, and several casual companies and 5 civilians (Y. M. C. A.) embarked. The ship sailed at 2.53 p. m., February 6.

Arrived at Newport News at 10.30 p. m., February 18. Docked at 7.37 a. m. the next day, and troops, 25 sick and wounded, and 9 patients admitted during the trip, disembarked. Went to Lamberts Point, where the ship was disinfected for vermin and rats by an officer of the United States Public Health Service, by the cyanide method, on February 21, the crew returning aboard at 11 a. m. on the 22d. Result of fumigation unsatisfactory.

After coaling, the ship sailed at 5 p. m., March 2. March 3, 9.45 a. m., "man overboard" drill.

March 5, aurora borealis could be plainly seen throughout the entire period of the first watch.

March 10, 6 a. m., sighted U. S. S. *Pueblo*.

March 12, 3.40 a. m., D. F. Jorday, chief machinist, second class, fell out of hammock, fracturing os pubis.

Arrived at St. Nazaire, France, 3.10 p. m., March 13.

On March 16, 77 officers and 2,839 men of the One hundred and seventeenth and One hundred and eighteenth Infantry, a part of the "fighting" Thirtieth Division (Old Hickory Division) and 1 civilian (Y. M. C. A.) embarked for the United States. No patients received for transportation.

At 2.06 p. m. on the same day sailed for Charleston, S. C.

March 20, 3.50 p. m., Flores Island, Azores, on the starboard side 5 miles distant, bearing 352° (true).

On this trip a mild epidemic of influenza developed among the troops, there being 34 cases, 1 of lobar pneumonia and 1 of broncho-pneumonia, Private Edward H. King, Company L, One hundred and eighteenth Infantry, who died at 1.30 a. m., March 28, after the ship had anchored in the harbor of Charleston, S. C.

Anchored off Fort Sumter at 6.15 p. m., March 27, and docked at North Charleston at 11.56 a. m., the 28th. Troops disembarked immediately and 12 Army patients admitted during the voyage were transferred to the United States Naval Hospital, Charleston, S. C.

April 1 at navy yard Charleston, S. C., discharging ammunition and dismounting guns.

April 2, 2.15 p. m., while removing No. 1 gun from the ship, crane and purchase broke, the gun falling into the water, striking the U. S. S. *Machias* at the water line amidships, staving in her side. Stand No. 158, carriage No. 174, and slide No. 197A were lost, but recovered the next day.

After coaling and taking on supplies, sailed from Charleston at 11.30 a. m., April 7.

April 12, 1.05 a. m., temperature of water dropped from 66° to 56°. Lookouts stationed in eyes of ship to watch for ice, but none was seen.

Arrived at St. Nazaire at 8 p. m., April 18, and on the 19th embarked the following: 107 officers and 2,830 troops of the One hundred and twelfth Infantry, Twenty-eighth Division (Pennsylvania National Guard) and 356 casual company, 3 Y. M. C. A. workers, and the wives of 2 enlisted men, one of whom was aboard the ship, the other having previously returned to the United States, and 1 Army civilian employee, wife, and baby. Under way at 5.30 p. m. the same day and anchored in the North Channel, Quiberon Bay, from 8 p. m. until 5.25 a. m. the next day (20th), when we got under way.

April 24, 2.31 p. m., changed course to speak to French brigantine flying international signal; gave her latitude and longitude and resumed course.

April 26, 5.15 p. m., Homer Dale Gardiner, private, Company I, One hundred and twelfth Infantry, died of mixed malignant tumor, later determined by microscopical examination to be adeno-carcinoma of pelvic abdominal and mesenteric lymphatics and liver.

April 29, 11.50 p. m., sighted Five-Fathom Bank Lightvessel.

April 30, 2.30 a. m., anchored 3 miles south of McCrea Shoal gas buoy.

At 6.30 a. m., under way, proceeded up Delaware River, followed by the U. S. S. *Mercury*. At 1 p. m. met by various committees on tugs, amid wild enthusiasm. At 3.15 p. m. moored to Pier No. 78, South

Philadelphia, and immediately disembarked troops and 25 patients admitted on trip. Remains and effects of Private Gardiner delivered to effects quartermaster. At 6.45 p. m. under way for navy yard, where we arrived at 7.45 p. m. Repairs made while in yard. Ship in dry dock May 1 and 2.

Repairs completed and ship under way at 6.15 a. m., May 10; foggy, overcast morning. When the ship got outside Delaware Breakwater it was still foggy, the sea was very rough, and there was no pilot boat to receive the pilot, so we proceeded, taking the pilot, Capt. Poynter, with us to France. He was rather a large man, and having started out with the idea of being at home in a few days, at the most, had very few clothes with him. He was able to borrow a few things here and there that he could manage to squeeze into. He seemed, however, to enjoy the trip, and made one liberty in St. Nazaire.

May 11 and 12, heavy fog during afternoon watch.

May 13, heavy fog during first dogwatch.

May 17, 6.11 p. m., U. S. S. *Florida* about 2½ miles distant on star-board beam.

May 19, heavy fog during first watch.

Arrived at St. Nazaire at 9.35 p. m., May 20. On May 21 embarked 110 officers, 4 field clerks, and 2,242 men of the Three hundred and fifty-second Infantry, Three hundred and thirteenth Train, Eighty-eighth Division, including Maj. Gen. William Weigel, commanding the Eighty-eighth Division, and staff; 5 civilians (Y. M. C. A.); sick and wounded, 20 enlisted men, Army; 5 officers, Army; and 383 United States Army and 12 United States Marine Corps mental cases, accompanied by 5 psychiatrists and 100 attendants. The mental cases were put in Nos. 6 and 7 holds, sentries posted, and an Army medical officer kept on watch at all times day and night. Fruit, candy, etc., were distributed to them frequently; a victrola furnished music; band concerts were held by No. 6 hatch, and moving pictures shown in No. 6 hold daily.

At 5.50 p. m. the same day (21st) we got under way, and after an uneventful voyage anchored at Hampton Roads at 8.19 p. m., May 31, and secured pratique.

The next morning at 7 o'clock docked at Newport News and disembarked troops, patients, and civilians.

Coaled at Lamberts Point, and at 8 p. m., on June 5, went to navy yard, Norfolk, for repairs.

On June 7, while cleaning over the side, Samuel Marcus, seaman, second class, fell from staging and was drowned. Did not come to surface and could not be found by several of his shipmates who dived for him immediately after he fell. Diving apparatus was

secured, and at 11.30 a. m. diver rescued his body. After one hour's unsuccessful attempt to resuscitate him with lung motor and artificial respiration remains were embalmed and forwarded to his home in Bangor, Me., accompanied by flowers from his shipmates.

At 8.06 a. m., June 10, left navy yard, Norfolk, for France. At 9.51 a. m., schooner *Anna Camp*, of Providence, R. I., standing up river in middle of channel, made no attempt to get out of the channel or clear the *Pocahontas*. When a head-on collision seemed imminent, schooner's steersman deserted wheel but later returned, putting wheel down, thus bringing schooner partially up into the wind. Due to excellent seamanship on the part of the commanding officer of the U. S. S. *Pocahontas*, who was at that time conning the ship, there was no collision, but the mizzen sail scraped along the starboard davit heads, doing no damage to the *Pocahontas* and no apparent damage to the schooner.

Navy yard employee adjusted radio compasses from 11.26 a. m. to 1.25 p. m.; left ship on S. C. No. 409 at 1.25 p. m. At 1.41 p. m., standard speed ahead, both engines. At 2.25 p. m., Atlantic Fleet, by divisions, holding target practice on starboard side 5 to 8 miles distant. Heavy fog during first dogwatch.

June 13, heavy fog during second dogwatch.

June 20, passed fleet of fishing vessels during morning watch.

Arrived at St. Nazaire at 10.36 p. m., June 20, and from midnight to 2.50 a. m., the 21st, 73 officers and 2,795 troops of the following organizations embarked: Three hundred and twentieth Service Battalion, Two hundred and fifty-fifth, Two hundred and fifty-sixth, and Two hundred and seventy-sixth Military Police Corps, Three hundred and twenty-eighth Motor Transport Corps, Two hundred and twenty-first and Three hundred and twenty-eighth Replacement Units, One hundred and tenth Camp Hospital, One hundred and ninth and One hundred and tenth Guard Companies, 6486, 6489, 6498 Casual Companies, and 44 nurses from Base Hospitals No. 11 and No. 101.

At 9 a. m., the 21st, 85 mental cases, accompanied by 2 psychiatrists and 40 attendants, were put in No. 7 hold and a medical officer kept on watch at all times, day and night.

On this voyage an unpleasant incident occurred. An Army officer assigned specific duties (police officer) became intoxicated and unable to perform duty. The matter was reported to the commanding officer of the ship, and at his direction the officer was admitted to the sick list and cared for in the sick bay until sober. Upon arrival in port the commanding officer of troops reported the case to the commanding general port of debarkation for action.

During June 24 and 25 barometer varied from 30.69 to 30.81, with a correction of only $-.02$ obtained at Norfolk on June 9.

June 30, heavy rain squalls during midwatch. Arrived at Newport News at 10.15 a. m., July 2, and all Army personnel immediately disembarked; mental cases and 13 patients admitted during trip transferred to hospital.

At 4.15 p. m. the same day arrived at Lamberts Point for coaling, and at 7 p. m., July 5, arrived at the navy yard, Norfolk, for repairs.

July 8, Ensign H. E. Knowlton, United States Navy, transferred to United States Naval Hospital, Norfolk, lobar pneumonia, and died there July 14.

At 4.26 p. m., July 10, left navy yard, Norfolk, and arrived at Brest at 3 p. m., July 20, remaining there until 2.15 p. m., the 22d.

By orders of the naval port officer, no liberty was granted the enlisted personnel on the 21st, because there was a strike by all workmen throughout France for that one day only. They desired a holiday and simply took it.

At 10 a. m., the 22d, 124 officers and 2,855 men of the following organizations embarked: Three hundred and eighth Field Signal Battalion, Twenty-fourth Train, Third Corps Headquarters, Third Army Military Police Battalion, Four hundred and fifteenth Motor Supply Train, Evacuation Ambulance Companies 17, 29, and 37, Base Hospital No. 91, Brest Casual Company 3218, Pontanezan Casuals, and casuals "for orders."

After an uneventful trip the ship arrived at Hoboken at 10 a. m., August 1. Seven patients admitted during the trip were transferred to the hospital, and troops disembarked at 10.30 a. m.

At 8.30 a. m., August 8, under way for France.

August 17, 5.25 p. m., nut on stay rod of salt-water gravity tank blew off, flooding starboard side of "C" deck and running down into the blacksmith shop.

Arrived at Brest at 7.47 a. m., August 18. During this trip lost the tip (about 15 inches) of one of the port propeller blades. This blade and the one opposite were discovered to be cracked and a report made to that effect when the ship was in dry dock in the Philadelphia Navy Yard on May 1 and 2. The opposite blade is still holding.

Both starboard and port high-pressure piston rings were discovered broken upon arrival and steps taken to have new ones made.

This trip has been looked forward to for a long time by all hands, as it is the "Paris leave" trip, the first party shoving off on the afternoon of the 18th and returning on the afternoon of the 23d; the second party shoving off immediately upon the return of the first and returning on the afternoon of the 28th. Everybody tired but happy.

Places of interest in Paris were seen and points on the battle front visited by various members of the leave parties, some of the officers getting as far as Brussels. The writer can speak personally of the beauty of the Marne Valley, the excellence of the French roads, and the devastation done in Château-Thierry and Soissons. Fields which were occupied by barb-wire entanglements, trenches, and heavy ordnance a year ago are now beautiful with ripening crops.

At 5 p. m. on the 26th the commanding officer was informed that the *Pocahontas* was designated to return home via Ponta del Garda, Azores, to pick up 14 naval officers and 55 enlisted men. At 3 p. m. on the 27th the U. S. S. *Kroonland*, her engines being disabled, undertook to shift anchorage towed by the tug *Penobscot*. There was a 2 to 3 knot tide running and as she crossed our bow she became unmanageable and drifted down on us. We immediately veered from 60 to 150 fathoms at the water's edge and the *Kroonland* let go her port bow, at an angle of about 30°. She was made fast until additional tugs could be procured. At 4.50 she was clear and under way to her anchorage.

Very little damage was done to the *Pocahontas*. About 40 feet of rail carried away, deck beading buckled in one place, and a coal chute, rigged for coaling the next day, was crushed.

The *Kroonland* crushed her starboard gangway and practically all the "doughnut" life rafts on starboard side; carried away a good part of her starboard rail and two boats davits of Nos. 1 and 3 lifeboats, besides denting in her side abaft the bridge.

At 6.30 p. m. a coal lighter moored to port side. At 4 a. m., August 28, severe storm came up; lighter pounding considerably and leaking. At 5.15 a. m. No. 1 motor-sailing launch got adrift; picked up after daylight; had been carried up against the tide by the wind.

At 10 a. m. tug took away lighter, which was still leaking and pounding heavily.

At 12.35 p. m. received orders to get up steam by 5 p. m. and come in to the dock (it takes 15 hours to get up steam and warm up engines).

At 4 p. m. coal lighters were alongside and the crew busy coaling ship. Wife and son of a former officer of the ship came on board for transportation to United States.

August 29, 6 a. m., crew coaling ship; 10 hospital corpsmen coaling. German prisoners expected at 8 a. m. to finish coaling.

At 9 a. m. severe rainstorm. German prisoners did not arrive, so crew still coaling, and finished at 2 p. m. Field day in progress.

Army officer came on board to arrange for us to take "war brides" to the United States and not make the trip to the Azores for Navy personnel.

August 30, obtained bill of health. Kirtly, ship's cook, second class, returned from Base Hospital No. 5, where he was operated on for appendicitis 10 days ago.

At 1 p. m. a liberty party sent ashore, consisting of about 125 men.

At 7.30 p. m. liberty party returned on board. Harbor very rough and entire liberty party got soaking wet; the entire party was sent to sick bay and a small amount of whisky given to each man to prevent taking cold. Out of a crew of 519, I think at least a thousand must have been on liberty, judging from the number who passed through the sick bay.

August 31: The motor sailing launch broke down last night about 11 o'clock while returning with officers from liberty. They had to break out the oars and row about a half mile, in a pouring rain, to the U. S. S. *Chattanooga*. Signal to the U. S. S. *Pocahontas* for a tow: reached the ship at 1.30 this morning, wet and cold.

At 11 a. m. troops, war brides, etc., embarking as follows: Casual Company 152, husbands 96; "war brides," 100; babies (3 weeks to 3 months old), 5; children (4 to 10 years old), 4; Army Nurse Corps, 13; Y. M. C. A. (women), 3; Y. W. C. A., 3; French civilian, 1. The latter, a young lady, who acted as interpreter and was of invaluable assistance to us in many dealings with the "war brides," was en route to attend Rockford (Ill.) College.

At 2.17 p. m. got underway with homeward-bound pennant flying and the band playing.

September 2, 7 p. m., barometer falling rapidly, 0.12 of an inch in last two hours.

September 3 and 4, severe storm during both days.

September 5, Army nurses very indignant because they must nurse ill war brides. One said she would refuse to obey certain orders of mine; however, she obeyed them. The isolation ward with 10 beds was used as a sick bay for the brides and proved very satisfactory. Accompanied by a nurse, interpreter, one hospital corpsman as recorder, and another with a pitcher of water and a bottle of laxative pills, I made the rounds at 9 a. m. every day, seeing every bride. Most of them felt "très bien." Sea has been smooth to-day.

September 7, Sunday: The chaplain preached his farewell sermon to officers, crew, and passengers in the ward room at 10 a. m. Vocal solo, "A Dream of Paradise," by De Wolf, of the band. The sea has been extremely smooth to-day. During the afternoon numerous flying fish were observed.

September 8, two soldiers had a fight to-day, one getting the left eighth rib broken at costo-chondral articulation.

September 10, 12 m., moored at Army pier No. 3, Brooklyn; 2 p. m., troops, war brides, and other passengers disembarked; war brides

going to Y. W. C. A. hostess house; one soldier with fractured rib sent to debarkation hospital.

September 12, had expected to begin discharging ballast and stores to-day preparatory to going out of commission, and everybody was happy, for all the reserves and duration-of-war men expected to be released immediately. A number of them desired to enter college and complete their education, which had been interrupted by the war, but orders were received to-day to be ready to sail on September 25 for Rotterdam, with German prisoners of war, internes, and others. Every one was much disappointed, but went to work with a will to be ready to carry out orders.

September 15, left pier, South Brooklyn, at 5.30 a. m., to-day, and proceeded to navy yard, where the ship was dry-docked (No. 3 dock) at 9 a. m.

September 21, the ship's band, all reserve men, released from active duty to-day.

Left dry dock at 2.10 p. m., to-day, and moored at Pier No. 3, Hoboken, at 4.10 p. m. While in dry dock Nos. 56 and 58 port propeller blades were removed and replaced by Nos. 66 and 70, spares; No. 56 had a new end welded on, and No. 58 had cracks welded, both being spare replacements. Starboard propeller blade No. 49 removed, end straightened, and replaced. Bottoms scraped and painted while in dock.

September 22, one chief nurse and two nurses reported; 5 p. m., the secretary of the Swiss Legation, Washington, accompanied by Gen. McManus, commanding embarkation headquarters, and Capt. Zuckschwerdt, German Navy, chairman of committee of returning officers and civilians, came on board for conference with commanding officer. None of them had positive information as to how many of the various classes were to come on board for transportation nor what equipment they would have.

It was decided that the women, children, naval officers, and civilians should be put in staterooms as far as they were available, the remaining civilians to go in upper holds 1 and 3; the warrant and chief petty officers in hold No. 7; and the prisoners of war in Nos. 4, 5, and 6. Arrangements for sick and insane made by senior medical officer after consultation with commanding officer and executive officer; sick to go in sick bay, and on "B" deck outside sick bay, weather screens being rigged; insane to go in isolation ward, which was immediately prepared by installing 18 bunks in place of 10 formerly there.

September 24, 125 Marines and 4 United States Marine Corps officers reported for duty as guards for prisoners; quartered in upper No. 2 troop hold.

Department of Justice representative on board to arrange for taking insane from the following New York State hospitals: Manhattan, Kings Park, Central Islip, and Willard. He was informed that they could not possibly be taken, as we only had facilities for carrying 18 who were coming from St. Elizabeths Hospital, Anacostia, D. C. A number of voluntary German civilian casuals for repatriation reported on board to-day and were assigned quarters. Mental cases arrived from Washington about 9 p. m., but remained on train, as isolation ward was not yet ready to receive them. At 10.30 p. m., two nurses (female) reported for duty from United States Naval Hospital, New York.

September 25, cargo and baggage are being loaded in cargo holds Nos. 1, 4, 5, and 6 and in lower troop holds Nos. 1 and 2.

More civilian casuals and internes arrived to-day. -Insane cases (18) came on board at 10 a. m., and were locked up in isolation ward, with two hospital corpsmen on duty in ward and a marine sentry outside the door with key. Several sick arrived. Four mental cases arrived from Ellis Island in charge of immigration authorities, but were not received as space for them was not available. One insane with a guard arrived from Manhattan State Hospital, Wards Island, and got to the sick bay. He and his guard were put on the dock; later, by some means, he got on board again without his guard and was discovered in the sick bay. After a hurried search his guard was found on the dock and he was again put off the ship in charge of his guard; nothing more was seen or heard of him. At 8.30 p. m. prisoners of war and internes who had been in the train on the piers for 18 hours embarking.

September 26, 1 a. m., finished embarking prisoners, internes, and sick.

At 6.05 a. m., got under way, with passengers as follows:

French deportee from Ellis Island (stowaway from U. S. S. <i>Montpelier</i> , Sept. 12, 1919).....	1
Prisoners of war from Fort McPherson, Ga. (Swiss Legation) :	
(a) Officers.....	56
(b) Warrant officers.....	49
(c) Chief petty officers.....	98
(d) Petty officers.....	142
(e) Privates (2 mental cases).....	909
Deportees (from Boston).....	13
Deportees (from Ellis Island).....	8
Civilians (16 mental cases).....	162
Civilians (repatriation Swiss Legation).....	125
Civilians (repatriation Swedish Legation).....	18
 Total.....	 1,581

Included in the above are the 18 mental and 38 other hospital cases.

Among the officers are the former commanding officers of the following ships: S. M. S. *Cormoran* (Guam), *Geier* (Honolulu), *Eitel Friederich* and *Kron Prinz Wilhelm* (Norfolk), *Odenwald* (San Juan, P. R.), and *U-58*, and the officer on watch in conning tower of *U-58* when she was sunk by the U. S. S. *Fanning* and *Nicholson* off Queenstown, November 17, 1917. The officers and crew of the *U-58* were brought to the United States on the U. S. S. *Leviathan* on her first trip. Among the prisoners are several who dug out of Fort McPherson and escaped, but were later captured.

The writer knew personally and had official dealings with the commanding officer of S. M. S. *Eitel Friederich* at the Norfolk Navy Yard during the summer of 1915. There is a very excellent band among the prisoners, and concerts are given aft daily.

September 28, the prisoners are well organized and give no trouble. They obey orders readily, and the holds are kept in excellent condition. Former Capt. Zuckschwerdt, of S. M. S. *Cormoran*, talked freely of his stay in Guam before the United States entered the war and appreciated the treatment he received there from the naval officers after he had blown his ship up rather than surrender it. He said he would always remember the words with which Captain Cronan greeted him when he surrendered aboard the receiving ship: "Sir, you are a brave man."

Paul Richter, C. M. M., late of S. M. S. *Eitel Friederich*, died at 1.29 p. m. to-day from cerebral hemorrhage. At the request of his commanding officer and the German committee he was buried at sea at 5 p. m. His remains were prepared in the usual way and placed in a canvas sack with 160 pounds of grate bars at the feet. At the appointed time the band played a funeral march; the procession, led by the chaplain, left the mortuary for after "A" deck, starboard side, where a bier had been erected. The funeral service was read, followed by prayer and a short sermon. Six of Richter's shipmates were pallbearers and a seventh followed with his iron cross, which had been awarded him in January, 1915. After the body had been committed to the deep the marine guard fired three volleys and the bugler sounded taps. During the funeral service the engines were stopped and the ship lay to.

September 29, the "spud-peeling gang" refused to work to-day because they received butter only twice a day while their officer received it three times. The commanding officer of the guard instructed his sergeant in the presence of a prisoner to pick out 10 of his huskiest marines and "introduce" them to the "spud-peeling gang." The prisoner immediately disappeared, and in a few minutes it was reported that the gang had reported and was peeling potatoes. The "introduction" was not necessary.

The first-class passengers decided that it would be a good plan to give a cabaret show in the wardroom and delegated Count Von Bernstoff's nephew to visit the troop holds, look up talent, and arrange for the show. He secured a pass from the executive officer and went below, but the prisoners, imbued with a spirit of democracy and political equality, refused to do anything in the way of entertainment.

Then they took up the question of a dance and secured the necessary permission from the executive officer, but, after discussion, it was decided not to have it. The reason assigned was that it was too sad a homegoing for dancing; the real reason being that the band, also thoroughly democratic, refused to play for those, who, formerly and still, consider themselves the elect.

This spirit of "all men being born free and equal," which is doubtless at present prevalent throughout Germany and which must be particularly distasteful to those who were the aristocracy of the late German Empire, will no doubt be the salvation of the German people and may in the course of time secure for the new republic a recognized place among the nations of the world.

September 30, two internes from Boston were caught stealing from some of the other passengers in No. 3 hold and given five days in the brig on bread and water, then to stay in the brig, for safe-keeping, for the rest of the trip.

October 1, barometer falling rapidly. Northern lights very brilliant and beautiful throughout the first watch.

October 2, strong wind blowing and heavy sea running. One of the ship's dogs washed overboard. There was a small fire in the soiled-linen locker due to defective wiring. It was extinguished with Pyrene before any material damage was done.

October 4, received orders from London last night to go through North Sea during daylight.

October 5, picked up Bishop Rock Light (Scilly Island) at 7.20 p. m. At 11 p. m., received orders to call at Southampton on return trip and pick up English and Scotch war brides.

October 6, 4 p. m., Isle of Wight abeam.

At 6 p. m., German band gave the following program during dinner:

MUSICAL PROGRAM.

- | | |
|---|-------------|
| 1. Marche Militaire..... | Shubert. |
| 2. Overture Lustspiel..... | Keler Bela. |
| 3. Waldesrauschen Standchen..... | Luedecke. |
| 4. Myrthenblätter Waltz..... | Druse. |
| 5. Sextette from Lucia Di Lammermoor..... | Donizetti. |
| 6. Am Bosporus Intermezzo..... | P. Linke. |
| 7. Delicatessen (Amorous Potpourri)..... | G. Klein. |
| 8. Heimatklaenge. | |

WM. WEBER., *Director.*

8 p. m., entertainment in wardroom as follows, Schmidt being a first-class passenger and Schwaller a patient, prisoner of war:

SPECIAL PROGRAM.

1. Song couplets in English and German, by W. J. Schmidt, professional vaudeville artist.
2. Zither solo-----G. Schwaller.
3. Card tricks-----W. J. Schmidt.

October 7, 5.32 a. m., Folkstone Light (England) on port beam; Gris Nez Light (France) on starboard beam.

At 6 a. m., destroyer No. 168, U. S. S. *Maddox*, came out from Dover with pilot to take the ship through the North Sea to Hook of Holland.

3.02 p. m., Mass Lightship, off Hook of Holland, abeam.

3.38 p. m., Dutch pilot came on board. Destroyer *Maddox*, which has been with us all day, left, heading west for Dover.

5 p. m., secretaries of the American and Swiss Legations, The Hague, boarded the ship from steam barge.

7.30 p. m., moored in Maashaven, Rotterdam.

October 8, at 9 a. m., prisoners commenced to disembark.

At 10.30 a. m., mental cases and patients disembarked. Prisoners and patients to depart by rail at 11.30 a. m.; civilians and mental cases at 3.30 p. m. The mental case from Manhattan State Hospital (New York), whom the writer put off the ship twice on September 25, came to the sick bay this morning to get some information about his baggage. Inquiry disclosed the fact that after exhausting all other resources he had gone to the secretary of the Swiss Legation and induced him to transfer him from a hospital case to third-class accommodation, and he had made the trip, keeping quiet until after arrival. The writer was glad to see him get home, but refused to take the responsibility of having a mental case at large on the ship.

As far as the Dutch are concerned, we are still at war with Germany, so no liberty can be given the crew, but sightseeing parties in charge of a petty officer, who must keep them together, may be sent ashore. Usual liberty for officers. The nurses before going ashore copied the name of the dock, which was painted over the door, this in order to give it to a cabman to bring them back to the ship. Before long, however, one of them found out that what she had copied was "Smoking prohibited on this dock." It was too good a joke to keep, so she told it on herself.

Five enlisted men from naval port office received aboard for transportation to United States.

Sightseeing parties returned in good order; one party of marines returned without the sergeant who had been placed in charge.

October 9, 2.15 p. m., under way for Antwerp.

The Mass (Meuse) River passes through a beautiful agricultural country thickly dotted with windmills. Many herds of cattle are seen and the fields are green and well cared for.

At 4.20 p. m. passed out of the river and into North Sea. River pilot left ship.

6.10 p. m., off mouth Scheldt River. River pilot came on board.

9.35 p. m., anchored off Vlissingen (Flushing), Netherlands.

October 10, 8.30 a. m., under way. At 11.40 a. m., crossed Belgian frontier, marked by tall watchtower built by the Germans in order that they might see what was going on in Holland.

11.50 a. m., Belgian quarantine officer came on board and granted *pratique*.

1.33 p. m., anchored in river. At 2.30 p. m., got under way.

3 p. m., entered lock; 3.35 p. m., Belgian pilot came on board and river pilot left the ship.

5.30 p. m., moored at pier 71a, "Siberia."

8 p. m., first leave party left the ship.

October 11, discharging cargo.

October 13, just at dinner time the writer received a message that he was urgently needed on the French ship *Nora Hugo Stinnis*, lying just astern of the *Pocahontas*. Upon arrival there I was conducted immediately to the cabin, where I found the captain dead of heart disease. He had spent the day in Antwerp and returned at 5 p. m. He died about 6.10 p. m. The *Nora Hugo Stinnis* is a French merchant ship obtained from Germany and manned by naval reserves.

October 14, called on French consul general to-day about the death of the French officer last night.

The following passengers embarked to-day: Provisional Battalion, prisoners of war escort, 24 officers and 944 enlisted men. Quartermaster Corps detachment, 1 officer, 61 men. One retired Army officer and 5 children; this officer is 82 years old, a Civil War veteran, and with his two daughters and three sons was interned in Germany during America's participation in the war.

October 15, 2 p. m., severe snowstorm, which lasted about 10 minutes.

Troops embarking as follows: Second Pioneer Infantry; officers, 29; enlisted men, 856; Army general court-martial prisoners, 5; casual officers, 6; Army field clerks, 2; Army nurses, 7. Total passengers, 1,941.

October 16, at 6.05 a. m., got under way; 11.50 a. m., anchored Vlissingen (Flushing), Netherlands.

October 17, at 7.05 a. m., got under way; passed through channel alongside dykes which surrounded the city; could almost step over on dykes.

At 9. Destroyer No. 168, U. S. S. *Maddox*, fell in with us. Later in the forenoon she came up on our port beam and took a number of pictures of the *Pocahontas*, then came around on our starboard beam for us to get pictures of her.

4 p. m., passed North Goodwin lightship; weather thick and fog-horn of lightship blowing, sounding exactly like a cow bellowing.

5 p. m., destroyer took Belgian pilot off and proceeded to Dover.

October 18, 12.30 a. m., anchored below Southampton.

6 a. m., under way; 8.30 a. m., moored at Southampton.

At 11 a. m., passengers embarked as follows: Navy officers, 4; officers' wives, 3; officers' children, 3; Navy enlisted men, 5; enlisted men's wives, 37; children, 10; United States Marine Corps enlisted men, 2; United States Marine Corps enlisted man's wife, 1; Army officers, 2; Army enlisted men, 10; Army wives, 20; Army children, 7; welfare worker, Red Cross, 1; Y. M. C. A., 1; total, 106.

To care for all the naval officers, women, and children in state-rooms, 5 Army medical officers were put in sick bay, 18 captains and first lieutenants in isolation ward, all temporarily, and about 40 first and second lieutenants put in No. 1 troop hold.

At 1.10 p. m., got under way for Brest, France.

October 19, at 8.55 a. m., anchored in Brest Harbor; at 11 a. m., transferred 31 officers and 2 field clerks to U. S. A. T. (formerly U. S. S.) *America*; 7 Army nurses, 10 United States Army enlisted men, 53 brides, 17 babies, and 1 Y. W. C. A. to Army camp at Pontanezan. At 4.30 p. m., U. S. A. T. *America* sailed with Admiral Halsted on board. French cruiser fired a 13-gun salute. Admiral Halsted relieved at Brest by Captain Hellweg, formerly commanding officer of the *Pocahontas*.

October 21, coaling ship. At 3 p. m., embarked the following: Army, 31 officers, 6 nurses, 30 enlisted men; Y. W. C. A., 7; Y. M. C. A. (prisoner), 1; American Library Association, 1; prisoners, 9; Navy officers, 5; officers' brides, 3; enlisted men's brides, 12; children, 5; enlisted men, 50; civilian employees, 14; total passengers, 2,117.

At 5.25 p. m., got under way for New York.

October 23, two soldiers missing. It is not known whether they came on board or whether they fell or jumped overboard. General muster of all the troops and a thorough search of the ship while troops were at muster failed to locate them.

October 24, there is a following wind and following heavy sea. During afternoon, holding summary court-martial in wardroom, first in one place, then in another. A witness and the stenographer turned over at one time. At 6 p. m., we were rolling so heavily (35°) that we had to change course and head up into the sea on a course

approximately southeast. At 9 p. m., sea quieted down and we resumed course. The commanding officer of troops desired to appoint a medical examining board to examine officers for demobilization, but was informed by his medical officers that it would be impossible to make the examinations, as a complete urinalysis and blood-pressure test were required. The colonel came to the writer to know if the apparatus was available. Upon being informed that it was, he appointed the board. After being appointed the board decided all they needed to make the examination was a stethoscope.

October 26, ran into another storm early to-day. At 7.15 a. m., a heavy sea on starboard beam broke on "A" deck smashing two ward-room port deadlights and injuring two soldiers. One sustained fractured clavicle, cuts on head, and severe bruises on thigh; the other, multiple scalp wounds necessitating two or three stitches each; one marine got a severe scalp wound.

October 27, at 11.45 a. m., passed a derelict schooner, the *B. B. Hardwick*, of Annapolis, Nova Scotia, sunk to water's edge and masts carried away, but on even keel.

October 28, 7.25 p. m., fire broke out in motion-picture reel store-room, burning up a two-reel comedy before it was extinguished.

October 30, received orders early this morning to be prepared to go out of commission upon arrival in port. The two soldiers who were discovered missing on the 23d were arrested in Brest on the 25th.

3 p. m., Nantucket Lightship abeam.

October 31, 5.30 a. m., Ambrose Lightship abeam.

At 8 a. m., off quarantine, pratique granted.

At 9 a. m., moored at pier No. 3, Hoboken, N. J. All passengers immediately disembarked. Eight Army and two Navy patients transferred to hospital. Preparations immediately commenced for going out of commission. The ship is to be turned over to the United States Army to be used as an Army transport.

10.30 a. m., the officer who is to command the ship as an Army transport reported on board.

The *Pocahontas* has the unique distinction of being the only transport attacked by an enemy submarine by gunfire.

This ship made nine round trips prior to November 11, 1918; carried to France 22,609 troops; brought back 373 sick and wounded and 27 insane.

November 22 and 25, one round trip was made between Newport News, Va., and New York, carrying a total of 4,713 troops.

Subsequent to November 11, she has made nine round trips, carrying to Europe 100 nurses, 1,580 German prisoners of war, internes, repatriates, and one French deportee; bringing back to the

United States 22,172 troops; 63 nurses, 88 sick and wounded, 480 insane, 12 wives of Navy enlisted men, 103 wives of soldiers, 20 civilians, 11 babies, and 14 Y. M. C. A. (men); 6 Y. M. C. A. (women), 7 Y. W. C. A., 5 children, 1 French student, 9 Navy officers, 6 wives of Navy officers, 1 wife of Marine officer, and 2 wives of Army officers.

During this time troops were on board 247 days. There were 1,358 admissions to the sick list, with a total of 2,973 sick days and a daily average of 20.16 patients.

There was a total of 28 deaths among Army personnel, 25 of these among troop passengers (19 occurring on one trip during the influenza epidemic), 2 among the sick and wounded, and 1 insane. One German prisoner of war died en route home.

During the time the ship was in commission there were 7 deaths among the crew; 4 occurring on one trip during the influenza epidemic, 1 from pneumonia, and 2 from accidental drowning.

The average complement during the war was about 626; subsequent to November, 1918, about 560.

The ship made two trips with 26 officers, after which additional officers joined the ship. Ensigns for training were constantly on board, being replaced by a new class after several trips.

From the date of commissioning July 25, 1917, until arrival Hoboken, October 31, 1919, the *Pocahontas* cruised 130,149.7 miles being actually at sea 460 days; in port 369 days:

Percentage of time at sea 55.5, in port 44.5.

ON BOARD U. S. S. "POCAHONTAS,"
April 29, 1919.

Capt. JOHN DOWNES, U. S. N.,
Commanding U. S. S. Pocahontas.

SIR: The undersigned officers of the Army desire to convey to you and the officers under your command an expression of their appreciation for the many acts of consideration and attention and the uniform courtesy which has made this voyage an occasion that will long be remembered by them as the brightest experience during their service in the great World's War just closed.

While we have labored against the foe on land and trust our efforts counted for the defeat of the enemy, we are none the less mindful of the part our comrade of the sea has played; of his contribution to the cause, his dangers, his privations, his gallantry, and his loyalty, without which our arms would have been useless.

The welcome extended us, the hospitality shown, the cooperation which made all duty a pleasure, could have but the one effect, and it is with the deepest sense of appreciation and the most sincere feeling of comradeship that we assure you of our best wishes and deepest love, expressing the hope that all deserved honors may be bestowed upon you.

We trust that the comradeship felt by us may be mutual and that throughout the lives of each of us there may continue to be the same fellowship to one

another and the same loyalty that has marked this voyage from a land of devastated material, broken hopes and hearts, to reunite us with all that is worth while, home.

(Signed) GEORGE C. RICHARDS,
Colonel 112th Infantry, Commanding
(And 100 other officers).

AT SEA, May 26, 1919.

From: The officers of the Eighty-eighth Division, United States Army, on board the United States naval transport *Pocahontas*.

To: The commanding officer, officers, and crew of the United States naval transport *Pocahontas*.

Subject: Letter of appreciation.

1. The officers of the Eighty-eighth Division, United States Army, both for themselves and the men under their several commands, desire, before reaching the land they have all longed for months to see, to extend to the officers and crew of the U. S. S. *Pocahontas* some expression of their gratitude and appreciation for the many courtesies and kindnesses of which, during the voyage from France, they have been the recipients.

2. After an absence of many months, spent among a strange people, in a land torn and mutilated by war, it is impossible to express in words the feeling that comes with the realization that we are once more with our own people. Nor have we yet fully realized it, though, thanks to the Navy as represented by you, we are fast becoming normal Americans again.

3. To the commanding officer, to every member of the commissioned personnel, and to every member of the crew we wish to say "Thanks and thanks"; and while the words are trite, we ask you to accept them as our best expression of an appreciation too deep, a gratitude too full, to be set out in words. "The Army and Navy forever."

WILLIAM WEIGEL,
Major General, Eighty-eighth Division, United States Army,
Commanding Eighty-eighth Division.

NAPOLEON W. RILEY,
Lieutenant Colonel, United States Army,
Commanding Officer of Troops
(And 98 other officers).

JUNE 30, 1919.

From: Commanding officer, United States troops and officers on board U. S. S. *Pocahontas*.

To: Commanding officer and officers and crew of U. S. S. *Pocahontas*.

1. After months of service in France on the part of some of us and years of service on the part of others of us, we find ourselves at last homeward bound with our task completed. It is with a feeling of satisfaction for service rendered and a feeling of joyful anticipation with which we now return to our native land.

2. While absent in Europe, our officers and men have been cognizant of the efficient work of the Navy during the last two years, and we wish to take advantage of this time to say formally to you, the captain of the ship, and its officers, that we are not unmindful of what has been done for us. While we all have for the Navy, in general, the feeling given expression to above, permit us to say that we feel the same is especially true of the officers and crew of the good ship *Pocahontas*.

3. We have been aboard the *Pocahontas* for a period of 10 days, and during that time there has been nothing but courtesy and keen cooperation on the part of the officers and crew in regard to official matters, and nothing but good comradeship among both officers and men of the Army and Navy.

4. That, sirs, is the feeling with which some of us, who are to stay in the service, go to our stations and the feeling with which some of us go to our homes. In leaving you permit us to show, by our signatures below, those of us who are of this feeling.

(Signed) EMMETT W. SMITH,
Major, Infantry, United States Army, Commanding
(And 71 officers and 44 Army nurses).

FLAGSHIP OF TRANSPORT FORCE,
UNITED STATES ATLANTIC FLEET,
August 16, 1919.

From: Commander transport force.

To: Commander John Downes, United States Navy.

Subject: Inspection of U. S. S. *Pocahontas*.

Inclosure: 1.

1. There is forwarded herewith for your information a copy of the report of board of inspection of the U. S. S. *Pocahontas* under your command August 7, 1919.

2. The force commander is pleased to note that the vessel under your command is in excellent condition throughout, as evidenced by the board's report.

(Signed) ALBERT GLEAVES.

Paragraph 156 of the above-mentioned report of board of inspection:

The ship is generally in excellent condition and, considering the age of the ship, the commanding officer, executive officer, and heads of departments deserve great credit.

E. McCauley,
Captain, U. S. Navy, senior member of board.

Approved:

ALBERT GLEAVES,
Vice Admiral, U. S. Navy,
Commander transport force, U. S. Atlantic Fleet.

U. S. S. POCAHONTAS,
Brest, France, August 31, 1919.

From: Commanding officer.

To: The crew of the U. S. S. *Pocahontas*.

At the conclusion of our stay in Brest the commanding officer desires to express to the crew of this vessel his appreciation of their very exemplary conduct both while on Paris leave and on liberty in Brest.

The officers in charge of the leave parties report that there was no fault whatever to be found with the leave parties' behavior on the train, either going or coming, and that the general appearance was far superior to that of other leave parties.

It is needless to say that it gives the commanding officer great pride and confidence to have a ship's company of this kind under his command.

The commanding officer earnestly hopes that those who went to Paris thoroughly enjoyed themselves and made the most of the trip, both in a way of pleasure and self-instruction.

JOHN DOWNES.
Original from
HARVARD UNIVERSITY

U. S. S. "POCAHONTAS,"

At Sea, September 9, 1919.

From: Commanding officer.

To: The men of the U. S. S. *Pocahontas*.

The time is fast approaching when the *Pocahontas* will be expected to end her career as a ship of the United States Navy, and many of you have no doubt planned that your experience in the Navy would end when the ship should be placed out of commission. Therefore it seems to me a fitting time to say to you, one and all, that never in my experience have I known a ship's company more uniformly industrious and hard working or more cheerful under the arduous conditions of service which have been the routine in the transport force. Many of you have seen no other naval service outside of this kind of duty and are not acquainted with the conditions in the purely military forces of the Navy.

It will be admitted at once that the transport force was perhaps the hardest working body of men of the Navy during the war as well as afterwards while the Army was returning to the United States, and the majority of you, if offered duty on the larger ships of the battleship force, would immediately accept such duty as a great relief from the strenuous life in the transports. You have all earned the best commendation and favored duty in the Navy, and it seems to me that by leaving the service at this time you are most surely depriving yourselves of the most delightful side of your naval career. Why not remain and see a short tour of duty on the military ships? There is no doubt that you would all make good with plenty to spare.

The Navy needs men, good men, not men to remain forever in lower ratings, but those who have had the training and can stand up under all conditions of service. Those men are now plentiful in the transport force, and it is my great pride to feel that the men of this ship are all that kind of men. Conditions in the country are such that many of you feel like trying your luck in civil life for a while, or some of you return to school or to positions left by you when you entered the service.

To those of you who feel that you must leave the service I want to say that I wish you the best of luck and regret that you can not remain to see more of the Navy and its work in time of peace. Do not forget that you can return to the service within four months and receive all the benefits of reenlistment.

To those who remain I say that I know you will make good and reflect credit on the good ship *Pocahontas*.

To you all I would like to state emphatically that the Navy always has room for good men and does not count the cost when it can keep the men.

JOHN DOWNES.

U. S. S. "POCAHONTAS,"

*September 20, 1919.**To the officers and men of the U. S. S. Pocahontas:*

The commanding officer takes pleasure in publishing to you the attached correspondence forwarded to this vessel by the former commanding officer, Captain E. C. Kalbfus, United States Navy.

Attention is particularly invited to paragraph 2 of Captain Kalbfus's letter, in which he requests that his own thanks and appreciation be expressed to you for your loyal and efficient cooperation in the successful accomplishment of a difficult mission.

JOHN DOWNES,

Commander, United States Navy, Commanding.

DESTROYER SQUADRON THREE, UNITED STATES ATLANTIC FLEET,

U. S. S. "ROCHESTER," FLAGSHIP,

North River, N. Y., September 17, 1919.

From: Capt. E. C. Kalbfus, United States Navy.

To: Commanding officer, U. S. S. *Pocahontas*.

Subject: Thanks and appreciation of War Department.

Inclosure: (A) Copy of War Department letter dated July 31, 1919.

1. I take great pleasure in forwarding, herewith, a copy of a letter received by me from the Secretary of War, in which he expresses to the officers and men of the *Pocahontas* his appreciation and thanks for splendid service rendered.

2. When the contents of this letter are imparted to the officers and crew of the vessel under your command, I request that my own thanks and appreciation also be expressed to them for their loyal and efficient cooperation in the successful accomplishment of a difficult mission.

(Signed) E. C. KALBFUS.

NAVY DEPARTMENT,

Washington, D. C., August 30, 1919.

To: Capt. Edward C. Kalbfus, United States Navy, Destroyer Force, Squadron Three, United States Atlantic Fleet.

Subject: Official efficiency record, letter of appreciation for file with.

Inclosures: 1.

1. The department takes pleasure in forwarding a letter addressed to you by the Secretary of War re appreciation of the War Department for the services rendered by you in connection with the transportation of troops abroad, and you are informed that a copy has been placed on file with your official efficiency record.

(Signed) FRANKLIN D. ROOSEVELT, *Acting*.

WAR DEPARTMENT,

Washington, D. C., July 31, 1919.

Capt. E. C. KALBFUS, U. S. S. *Pocahontas*

(Through the Secretary of the Navy)

MY DEAR CAPTAIN: The joint operations of the Army and Navy in connection with our overseas force is rapidly drawing to a close. Before the Navy forces engaged in the Army Transport Service are demobilized, I desire to extend to you and the officers and men of your command the thanks and appreciation of the War Department for the splendid service you have rendered in connection with the transportation overseas of the American forces.

I know of no one thing that stands out more prominently than the close cooperation which existed between the services during the past emergency, and I am sure it is equally gratifying to you to know that we are near the end of a successful operation of transportation overseas and returning to the American shores a force of over 2,000,000 men.

Cordially, yours,

(Signed) NEWTON D. BAKER,
Secretary of War.

IN MEMORIAM.

NAVY.

- H. E. KNOWLTON, ensign, United States Navy; born July 17, 1894; died, naval hospital, Norfolk, Va., July 14, 1919; lobar pneumonia.
- EVERET MONROE RESIDE, seaman, second class; born October 22, 1897; died, U. S. S. *Pocahontas*, Brest, France, January 9, 1918; lobar pneumonia.
- HUGH ST. ELMO CROFT, fireman, second class; born November 17, 1895; died, Ocean View, Va., June 17, 1918; accidental drowning.
- WESLEY WILLIAM HARBAUM, machinist's mate, first class (A); born December 18, 1897; died at sea, U. S. S. *Pocahontas*, September 29, 1918; lobar pneumonia.
- LIGON MOORMAN WHITE, seaman, second class; born November 15, 1900; died at sea, U. S. S. *Pocahontas*, October 3, 1918; lobar pneumonia.
- JULIUS AMANDUS ANDERSON, chief quartermaster; born June 25, 1892; died at sea, U. S. S. *Pocahontas*, October 3, 1918; lobar pneumonia.
- CHARLES GEORGE WALET, apprentice seaman; born November 26, 1896; died at sea, U. S. S. *Pocahontas*, October 11, 1918; influenza.
- SAMUEL WALLACE MARCUS, seaman, second class; born April 19, 1896; died, U. S. S. *Pocahontas*, navy yard, Norfolk, Va., June 7, 1919; accidental drowning.

ARMY.

- FRANK R. BRONSON, second lieutenant, Three hundred and fifth Bakery, Quartermaster's Corps; born, no record; died November 15, 1918; valvular disease, chronic cardiac.
- JESS BOND HEWITT, private, Three hundred and fourteenth Field Artillery; born September 4, 1894; died March 19, 1918; lobar pneumonia.
- CORNELIUS FROMMEYER, private, March replacement detachment, Camp Lee; born June 6, 1893; died March 23, 1918; lobar pneumonia.
- WALTER DAVIS, private, Third Company, Camp Lee; born September 20, 1894; died March 27, 1918; meningitis, cerebro-spinal.
- LOUIS W. LEONHARDT, private, First Provisional Recruit Battalion; born, no record; died June 9, 1918; drowning "A."
- JETHRO MCMAHON, private, Three hundred and thirty-second Labor Battalion; born July 18, 1895; died August 3, 1918; tuberculosis, acute pulmonary military.
- JAMES ANDERSON STEELMAN, private, First Overseas Casuals; born August 8, 1895; died September 27, 1918; lobar pneumonia.
- JOHN SEWELL, private, Eight hundred and thirteenth Pioneer Infantry; born December 18, 1888; died September 27, 1918; lobar pneumonia.
- ALBERT JOHNSON, Jr., private, Eight hundred and thirteenth Pioneer Infantry; born June 4, 1893; died September 28, 1918; lobar pneumonia.
- HARRY NANCE, private, Eight hundred and thirteenth Pioneer Infantry; born January 1, 1896; died September 28, 1918; lobar pneumonia.
- JOHN P. SHELDON, private, Twenty-first Overseas Casuals; died September 28, 1918; lobar pneumonia.
- WILLARD HAMM, private, Twenty-first Overseas Casuals; born September 14, 1893; died September 29, 1918; lobar pneumonia.
- WILLIAM J. WALSH, private, Medical Replacement Unit No. 41; born July 4, 1894; died September 29, 1918; lobar pneumonia.

RICHARD HARTMAN, private, Unit No. 1, Quartermaster's Corps; born November 26, 1892; died September 28, 1918; lobar pneumonia.

FRANK B. COFFEEN, sergeant, Medical Replacement Unit No. 44; died September 29, 1918; lobar pneumonia.

JOHN JAKOBER, private, Medical Replacement Unit No. 41; born, no record; died September 29, 1918; lobar pneumonia.

LEONARD F. MARINE, private, Second Overseas Casuals; born August 3, 1895; died October 2, 1918; influenza.

MARION ROBINSON, private, Second Overseas Casuals; born July 7, 1891; died October 3, 1918; lobar pneumonia.

HARLEY ELWIN WATERS, private, First Overseas Casuals; born January 28, 1889; died October 3, 1918; influenza.

JESSE CRAIG COMPTON, private, First Overseas Casuals; born April 6, 1896; died October 4, 1918; lobar pneumonia.

TOM LUCAS, private, Second Overseas Casuals; born January 18, 1891; died October 5, 1918; influenza.

ELMER, J. DALY, private, First Overseas Casuals; born November 20, 1893; died October 5, 1918; lobar pneumonia.

WILLIAM R. BURCHFIELD, private, Second Overseas Casuals; born May 26, 1889; died October 7, 1918; influenza.

JIM GANN, private, Company 1, Overseas Casuals; born November 22, 1895; died October 10, 1918; influenza.

WILLIAM PHILLIPS, private, Company 1, Overseas Casuals; born May 21, 1895; died October 11, 1918; influenza.

JOHN BENNETT, private, Fourth Machine Gun Battalion; born, no record; died November 12, 1918; embolism, pulmonary artery.

EDWARD HILTON KING, private, One hundred and eighteenth Infantry; born February 12, 1900; died April 14, 1919; broncho-pneumonia.

HOMER DALE GARDNER, private, One hundred and twelfth Infantry; born July 25, 1893; died April 26, 1919; adeno-carcinoma.

MEDICAL DEPARTMENT OF THE AMERICAN COMMISSION TO NEGOTIATE PEACE.¹

By A. D. McLEAN, Commander, Medical Corps, United States Navy.

On October 14, 1919, I received verbal orders from the Navy Department designating me as the medical officer to accompany "The Col. E. M. House Commission" to sail for France on the night of October 17, 1918. This commission consisted of Col. E. M. House and staff and Admiral W. S. Benson, United States Navy, and staff; in all, about 30 persons. Owing to war conditions, only verbal orders were issued, and great secrecy had to be maintained until our arrival in France.

The commission arrived in Paris October 25, 1918, and a few days later the German Government asked for armistice terms. Shortly after the armistice terms were signed, November 11, 1918, President Wilson appointed the "American Commissioners to Negotiate Peace."

¹ Extracted from official report to the Surgeon General, United States Navy.

Col. E. M. House being one of them. Upon their arrival in Paris, December 14, 1918, the former "Col. E. M. House Commission" then became a part of the "American Commission to Negotiate Peace," and I then became the senior medical officer of this new commission.

Previous to the arrival from the United States of the other commissioners, many steps were taken in Paris toward organizing of the various departments and personnel of the new commission, and as I had already been designated the medical officer of this commission I at once took steps to organize its medical department, equip a dispensary, and make necessary arrangements at the several United States Army hospitals for receiving such patients from the personnel of the peace commission as might require hospital treatment. Provision also had to be made for procuring female nurses from the American Red Cross and United States Army for those cases which for various reasons would not be sent to the hospital.

The Hotel Crillon had been leased for the entire use of the American Peace Commission, and on December 15, 1918, a fully equipped dispensary was opened in three large rooms of the hotel, where medical attention and prescriptions could be obtained daily from 9 a. m. to 9 p. m., and satisfactory arrangements made for caring for any emergency night calls which might arise.

Considerable work was necessary in equipping the dispensary, for in addition to medicines, surgical supplies, and dispensary furnishings, gas for the instrument sterilizer and compressed air had to be piped in from the main hall of the hotel.

Most of the medicines, surgical dressings, and dispensary equipment were furnished gratis by the American Red Cross, and their rapid handling of requisitions and hearty cooperation was of great help in equipping the dispensary. Some medicines and equipment which could not be furnished by the American Red Cross were bought through the purchasing department of the peace commission.

The personnel of the medical department consisted of two medical officers, one chief pharmacist's mate, and two pharmacist's mates, second class.

The entire personnel of the peace commission, including messengers, orderlies, and chauffeurs, amounted to about 1,300 persons, and, in addition to their medical requirements, many things along the line of sanitation and personal hygiene were done for them.

Most of the work was done in the dispensary, where 9,264 calls for treatment or medicines were attended to, but in addition to this 2,255 visits were made to patients ill in their rooms or at their places of residence, for the hotel was not sufficiently large to accommodate all the personnel of the commission.

During the time embraced in this report (December 15, 1918, to October 1, 1919) 44 patients were sent to the hospital, most of them being cases of pneumonia or influenza. Eight cases, four of measles and four of mumps, were sent to the contagious hospital.

The dispensary furnished 25 different missions with first-aid kits for use while away in foreign countries on peace-commission duties.

Owing to the continued prevalence of influenza and respiratory infections in Paris during the entire winter, the personnel of the dispensary was kept very busy. Although there were several sharp outbreaks of influenza and pneumonia during that period, only two deaths occurred.

With the final signing of the Austrian treaty, and, a few days later, the handing of the Bulgarian treaty to the Bulgarian commission, most of the work of the "American Commission to Negotiate Peace" was completed, and I then made plans to return to the United States, leaving Paris October 6 and arriving in Washington, D. C., October 15, 1919, after an absence of one year on duty as the medical officer of two commissions, viz, the "Col. E. M. House Commission," from October 17, 1918, to December 14, 1918, and the "American Commission to Negotiate Peace," from December 14, 1918, to October 6, 1919.

TESTING WATER FOR STORAGE BATTERIES.

Report from the Laboratory, United States Naval Medical School, Washington, D. C.¹

It is not only the kind but also the quantity of dissolved substances that render a water unfit for use in storage batteries. This information can be obtained accurately only when delicate balances and other special apparatus are available. It is believed, however, that the following tests will serve to indicate in a general way whether a water can be safely used until a water of known suitability can be obtained. The substances dissolved in water are salts of various kinds, but principally those of sodium, calcium, and magnesium, and in nature are the chlorides, bicarbonates, sulphates, and nitrates. (Nitrites are never present in a quantity that need be considered.) The relative quantity of the bases sodium, calcium, and magnesium is never constant, nor is that of the acids, the chlorides, bicarbonates, sulphates, and nitrates. For example, if only a trace of chlorine is found it does not mean that the water contains but little dissolved substance. It can easily have 0.1 per cent of other salts. If tests for three acids; that is, for chlorides, bicarbonates, and sulphates, and tests for two bases; that is, for calcium and magnesium are

¹ Supplied in response to telephonic request from the Bureau of Steam Engineering.

made, it is possible to determine roughly if the water is rich or poor in salts.

As iron is so objectionable, a test for that must also be made. To 10 c. c. of the water add 3 or 4 drops of nitric acid and then 8 to 10 drops of a 5 per cent solution of silver nitrate. Nothing more than a faint opalescence or milkiness should be produced. Make the observation against a black background. A reaction stronger than mentioned indicates too much chlorine and the water should be rejected.

To 10 c. c. of the sample add 2 or 3 c. c. of clear, fresh limewater. Not more than a slight clouding or a very small precipitate should be immediately produced. Too much precipitate indicates a large quantity of bicarbonic acid, which must necessarily be in a combination with a large quantity of some base as sodium, calcium, or magnesium. Such a water should be rejected. A cloud or precipitate appearing after four or five minutes should be disregarded.

To 10 c. c. of the sample add not more than 4 or 5 drops of hydrochloric or nitric acid and then 8 to 10 drops of a 5 per cent solution of barium chloride. If anything more than a slight white precipitate is obtained, the water should be rejected. This is a test for sulphates; and while the sulphate is not of itself injurious, a heavy reaction indicates the presence of a large quantity of bases.

To 10 c. c. of the sample add about 10 drops of a 5 per cent solution of sodium phosphate and heat to boiling. Only a slight gelatinous precipitate should be obtained. A reaction greater than this indicates a rather large quantity of calcium or magnesium, or both.

The test for iron in electrolyte can not be applied to water, for in the latter, especially when fresh drawn from spring or well or otherwise, the iron is very likely to be in the ferrous form, a form in which it does not react with the ammonium thiocyanate. The following is recommended: Place 100 c. c. of the sample in a beaker; add to it about 1 c. c. of a 5 per cent solution of sodium carbonate or a little baking soda and boil for about five minutes. The separation of a precipitate which is brown or which turns brown while boiling very probably indicates a considerable quantity of iron.

To prove it to be iron allow to settle, pour off most of the clear fluid, dissolve the precipitate in 3 or 4 drops of nitric acid, and then add to this a few drops of a solution of ammonium thiocyanate. If iron is present a red color is produced. A reaction greater than a faint reddish tinge indicates too much iron and the water should be rejected. Nitric acid or nitrates are rarely ever present in sufficient quantity to be objectionable unless some or all of the above ingredients are also in excessive quantity. A test for nitrates is therefore unnecessary.

The method as given is not entirely satisfactory, but it is the best that can be given at this time. For a proper trial a number of natural waters that are objectionable should be obtained and the above method applied. It is not an easy matter to obtain in the city samples that are objectionable. Samples prepared artificially are not satisfactory. However, when tried on samples that were obtainable the results were very fair.

The development of a rapid quantitative method is quite a task, but will be undertaken. Much time must necessarily elapse before the work is completed, even if completion is possible.

BOOK NOTICES.

EDUCATION IN WAR AND PEACE, by *Stewart Paton, M. D.* Paul B. Hoeber, New York, 1920.

An attractive little volume containing three very readable essays. "Human Behavior" begins with a reference to the possibility for "civilized man to revert within a few hours to primitive man," as illustrated by Germany. In the words, "the change first startled and then depressed us," the author epitomizes what was probably an almost universal experience in this country. Next the indifference of even the members of the peace conference to inquire into those "'predispositions' which incline people either to make peace or drive them into war" is deprecated. A strong plea is made for the study of human character by physicians, and the increasing opportunities for so doing afforded by the war is emphasized.

In "War Education," the author lays down the principle that education should "assist human beings, first, to measure their own physical, emotional, and intellectual capacities; and, second, to adjust their lives so as to give free expression to their natural and not, as is so often the case, to thwarted or distorted propensities." Educators should give more consideration to the "deep emotional undercurrents shaping" the student's personality. They neglect the basic instincts in which character is founded. The protection of the pupil's mental life is neglected. The significance of suppressed emotions and of the too free expression of them are referred to. Definite suggestions follow.

The last paper, "The Psychiatric Clinic," is a brief historical résumé of the development of the idea of soul analysis and urges the study of man as a living organism instead of by investigation of the separate parts of his physical structure.

THOUGHTS OF A PSYCHIATRIST ON THE WAR AND AFTER, by *W. A. White, M. D., superintendent St. Elizabeths Hospital, Washington, D. C.* Paul B. Hoeber, New York, 1919.

The book begins with a reference to the inevitableness of conflict in the course of progress and development. The natural instincts and their reactions are analyzed and reduced to the fundamental ones, self-preservation and reproduction. Progress from savagery to civilization consists not in repression of instincts but in the ways in which they are gratified—a process of sublimation. The neces-

sity for the individual's adaptation to the needs of the herd is a powerful factor in that process.

Chapter III discusses the integration of social groups. "In both the living organism and in society * * * increasing numbers of organs are able to function effectively because * * * their several functions have been so related that * * * they serve their special ends * * * but are subordinated to the good of the whole group." Given actions are ethically judged by their relation to individual or social interests. Conduct has to be estimated on the basis of the maturity of individual or group. Some of the horrible phenomena of retrogression which have marked the recent war are explained by the fact that many individuals attained a degree of repression beyond that attained by the mass and these individuals who appeared to represent a general level of progress themselves lost temporarily their reason and become violent partisans of retrogression. Repression is an essential feature of cultural progress. "The repressed material goes to form what is known as the unconscious," and its essential nature is selfishness. It is this which war has uncovered.

Under the head of "Psychological effects of war," the author shows how instincts which, when repressed in time of peace, produce at the worst neurosis, crippling only to the individual, break out in war to the detriment of the many. Of great interest are the paragraphs which touch on the relation of feelings to opinions; on fear in relation to the infant's idea of omnipotence and the realm of fancy in which child and savage so largely live. On the other hand, war has its better side; that in which the individual sinks his aims in those of the herd and the energies devoted to selfish purposes become available for national ends; that in which a maximum of repression is manifested by a host of individuals for the common good. In discussing the causes of war White sees in its periodical recurrence the ever-recurring need of breaking out of some impasse, social and political. It is the starting point of new constructive processes. In the past, war has been essential to readjustment. That this must always be so is not affirmed or denied. War creates two different waves of influence: One making for a greater equality among nations and affording enlarged scope for the effort and development of the individual, and another subordinating the individual to the service of the group socialism.

We commend this book, as well as Paton's to the thoughtful reader, both lay and medical, and felicitate the authors in the production of thought-compelling essays free from technical language, forcibly and clearly written.

PASTEUR, THE HISTORY OF A MIND, by *Emile Duclaux*, late member of the *Institute of France*, professor at the *Sorbonne*, and director of the *Pasteur Institute*. Translated by Erwin F. Smith and Florence Hedges, pathologists of the United States Department of Agriculture. W. B. Saunders, Philadelphia, Pa., 1920.

The translators have conferred a very real benefit on the American medical profession by making Duclaux's remarkable work available to English readers. The translation has been well done, and the introduction giving a sketch of the author's life adds greatly to the charm of the volume. Without the original at hand a careful criticism of the rendering into English is impossible, but there is every reason, from internal evidence, to believe that the translating has been accomplished with skill. It must have been no small task to convey so smoothly the meaning of a writer at once highly technical and given to flights of fancy and to poetic imagery. The use of *Auvergnaise* to describe a native of Auvergne, and the slight obscurity involved in the use of the word *caves* are the only features that might be questioned. Are caves or cellars meant?

Of Duclaux's magnificent account of Pasteur's career, it is hard to speak with sufficient moderation. The book has a permanent place in the history of scientific progress. While it gives in great detail the various experiments in crystallography, fermentation, bacteriology, immunity, etc., which made Pasteur the foremost scientist of the age, the style is so clear, so brilliant, so imbued with the philosophic spirit that even the reader not fully prepared to understand all the details will be rewarded by reading the volume carefully. Duclaux has achieved in a masterly manner his purpose of disclosing the character, mind, or spirit of the immortal Pasteur.

A TEXT-BOOK OF PHYSIOLOGY, by *Russell Burton-Opitz*, S. M., M. D., Ph. D., associate professor of physiology, *Columbia University*. W. B. Saunders Co., Philadelphia, Pa., 1920.

This is a book of over 1,100 pages intended for students and practitioners of medicine. It is beautifully written and will be delightful reading for the doctor who wishes to refresh his memory on this subject. The reviewer is not in a position to state how far this work will meet the needs of the student of to-day, but the latter must clearly have at his command more knowledge of biology and its terminology than was common in undergraduates 25 years ago. Words like *thigmotactic*, *chromosomes*, *centrosomes*, etc., are used in the text but not defined, and in many instances are not listed in the index.

The frequent references to the history of physiological research are of distinct value. The curriculum of the medical school is

already overcrowded, and any lengthy course of medical history would seem impossible at present, but teachers of the several branches should advert to the history of their subjects. Unfortunately the index of the book under discussion does not enable the reader readily to put his hand on the historical material he might be in search of, though such data are present to an extent showing no small classical knowledge and research. For example, on page 203, under cytoplasm, there is a note citing the work of Wharton Jones and Davaine, but neither of these names appear in the index nor are they referred to under cytoplasm. A separate index of names and historical data is suggested as an improvement for a subsequent edition. Gaglio, Caselli, Biedl, Fischera, Aschner, Trembley, and many other workers and their labors are mentioned in the text, but one must read the volume in order to find them. The reference on page 247 to opsonins (p. 203) is to phagocytosis, as opsonins are actually discussed on page 205.

Galinus has a line in the opening chapter and *Galenus* four lines on page 671, and Hippocrates and Alkmeon introduce a résumé of the history of the development of cerebral topography, but the index does not give them. Similarly, Broca is spoken of in several connections and the convolution named for him is described and discussed, but there is nothing in the index about Broca, and the only reference under convolutions is to those of the cerebellum. More time for the thankless task of criticism would probably develop other negligences in this one particular. Certainly for all classes of readers an index of great completeness is an indispensable feature of every scientific textbook. But with the above minor reservations, the book can be highly recommended to those who wish to have at hand one not too large to be easily manipulated which shall give a thoroughly scientific and clear presentation of a topic, neither distorted by undue divagations nor so brief as to make other textbooks necessary for a good understanding of the facts set forth.

ORTHOPEDIC AND RECONSTRUCTION SURGERY, INDUSTRIAL AND CIVILIAN, by *Fred H. Albee, A. B., M. D., Sc. D., F. H. C. S., professor of orthopedic surgery New York Post-Graduate Medical School, etc.* W. B. Saunders, Philadelphia, Pa., 1919.

In a certain sense no valuable critique of such a volume can be written by one who is not an orthopedic surgeon. On the other hand, it is no insignificant testimony to the clear insight into his subject which the author possesses and is able to impart to the reader for a plain medical man to pick out at random a half dozen descriptions of serious conditions and the complicated operative and mechanical details of treatment and be able to understand them. The great majority of the 800 excellent and mostly original illustrations really

explain the text, and this is not always true of medical works, in too many of which slight differences between the written and the drawn description make for confusion.

The history of the more important operative procedures is outlined, and each chapter is followed by a long list of references to the current literature. The author's style is simple, clear, and convincing. He tells what he does and why and cites his results. There is no long argument, no confusing balancing of opinions. The last chapter, devoted to military and industrial reconstruction surgery, though valuable, is the least attractive feature of this very complete work, due doubtless to the fact that it is in considerable part a compilation.

MANUAL ON FOOT CARE AND SHOE FITTING, by *W. L. Mann, Ph. B., A. M., M. D., Lieutenant Commander, Medical Corps, United States Navy, and S. A. Folsom, M. D., Lieutenant, Medical Corps, United States Navy.* P. Blakiston's Son & Co., Philadelphia, Pa., 1920.

This handy volume of something over a hundred pages is intended to assist the line officer to a better realization of the importance of caring for his men's feet and at the same time furnish him with the essential details of this care. In view of this worthy purpose and because of the concise array of valuable details about feet, shoes, and socks in barracks and on the march, it is a pity that the text was prepared with such haste as to preclude the avoidance of many mistakes of grammar, spelling, and punctuation. The typographical errors are numerous. Too many of our professional men seem utterly indifferent to the form in which a message is couched, apparently assuming that the importance of what they have to say outweighs the necessity for simplicity, clearness, and correctness.

THE GOLD-HEADED CANE, by *W. Macmichael, M. D.*, Paul B. Hoeber, New York, 1920. (Reprinted from the 1915 copyright edition.)

This is a charming and well-known assemblage of brief biographical sketches of British medical men of the eighteenth century. It gives a good picture of the practice of the period and abounds in amusing incidents and anecdotes.

THE TREATMENT OF SYPHILIS, by *H. Sheridan Bakctel, A. M., M. D., professor of preventive medicine and hygiene, Long Island College Hospital, Brooklyn.* The Macmillan Co., New York, 1920.

In the preface the author announces that his book is not written for the skilled syphilographer but for the practicing physician not familiar with the mechanical details of that intravenous medication now deemed indispensable for the resultful treatment of lues. The first five chapters are devoted to the principles underlying the Wassermann reaction; the history, chemistry, manufacture, and indica-

tions for use of the principal arsenical remedies now in vogue. The remainder of the volume, fully illustrated, gives in detail the technique of all the steps involved in the intravenous treatment of the disease. The pages abound in quotations from men of international reputation, and in this way the reader is afforded a wide view of prevailing expert opinion regarding the details discussed.

SURGICAL SHOCK AND ANOCT-ASSOCIATION. by *G. W. Crile, M. D., professor of surgery, Western Reserve University, and W. E. Lower, M. D., associate professor of genito-urinary surgery, Western Reserve University.* Second edition, W. B. Saunders Co., Philadelphia, Pa., 1920.

This is virtually the original work enlarged and corrected up to date.

PHYSICAL RECONSTRUCTION AND ORTHOPEDICS. by *H. E. Stewart, M. D., instructor in medical and orthopedic gymnastic, New Haven Normal School of Gymnastics, attending surgeon New Haven Orthopedic Dispensary.* Paul B. Hoeber, New York, N. Y., 1920.

Less than half the book deals with physical reconstruction in the common acceptance of the term and the rest with orthopedics. The opening chapter, devoted to the subject of exercise, is an admirably simple and clear exposition of the best modern thought on the subject. This is followed by a brief summary of hydrotherapeutic and electrotherapeutic measures in vogue and the main guides to their employment. Chapter III consists of 30 pages on massage. The chapter on vocational therapy is brief and rather disappointing, the author outlining only the purpose of such therapy and frankly declining, for lack of space, to go into details. Naturally orthopedics can not be exhaustively handled in seven score pages, so this part of the volume is in the nature of a syllabus. It will serve as an introduction to the subject, and the system of exercises recommended will help the general practitioner in carrying out the specialist's directions. The fullest and most practical portion of this section is the chapter devoted to foot strain.



VOL. XIV

NO. 4

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DEPARTMENT OF THE SERVICE

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CAPTAIN J. S. TAYLOR, MEDICAL CORPS, U. S. NAVY
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Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume I, No. 1, April, 1907.
Volume II, No. 1, January, 1908.
Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
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TABLE OF CONTENTS.

	Page.
PREFACE	v
NOTICE TO SERVICE CONTRIBUTORS.....	vi
SURGICAL ACTIVITIES AT THE NAVAL HOSPITAL, NEW YORK.	
INTERESTING BONE CASES.....	512
FRACTURES OF THE ANTERIOR TUBEROSITY OF THE TIBIA AND OSGOOD-SCHLATTER'S DISEASE.....	516
CARREL-DAKIN TECHNIQUE FOR EMPYEMA.....	527
PHYSICAL THERAPY.....	535
OCCUPATIONAL THERAPY.....	536
WAR WOUNDS OF THE JOINTS.	
By Dr. L. Delrez, Faculty of Medicine Liège.....	537
A CASE OF JOINT TREATMENT BY WILLEMS'S METHOD.....	545
CHRONIC INTESTINAL STASIS.....	545
CARREL-DAKIN TECHNIQUE IN TREATMENT OF CARBUNCLE.....	549
A CASE OF SARCOMA OF THE FOOT.....	550
A CASE OF JACKSONIAN EPILEPSY WITH SPASTIC CONTRACTURE.....	551
A CASE OF OSTEOMA OF THE HUMERUS.....	552
A CASE OF BONE INFECTION RESEMBLING SARCOMA.....	552
WOUND CLOSURES AFTER CARREL-DAKIN TREATMENT.....	553
ETHER IN PERITONITIS.....	557
HISTORICAL:	
THE FOUNDERS OF NAVAL HYGIENE, LIND, TROTTER, AND BLANE.....	563
EDITORIAL:	
HOSPITAL STANDARDS—AS SEEN FROM WITHIN.....	629
SUGGESTED DEVICES:	
VISION TEST APPARATUS.	
By Lieutenant Commander H. W. Giltner, Medical Corps, U. S. N. R. F.....	637
TREATMENT OF CEMENT FLOORS.	
By Captain A. Farenholt, Medical Corps, U. S. N.....	638
CLINICAL NOTES:	
OPHTHALMITIS IN SECONDARY SYPHILIS.	
By Lieutenant Commander W. H. Whitmore, Medical Corps, U. S. N.....	639
TWO CASES OF OPTIC ATROPHY.	
By Lieutenant Commander C. B. Camerer, and Lieutenant G. L. McClintock, Medical Corps, U. S. N.....	641
ARSPHENAMINE IN MALARIA.	
By Lieutenant Commander W. H. Michael, Medical Corps, U. S. N.....	643
URETERAL CALCULUS.	
By Commander W. J. Zalesky and Lieutenant Commander P. F. Prioleau, Medical Corps, U. S. N.....	644

	Page.
PROGRESS IN MEDICAL SCIENCES:	
GENERAL MEDICINE.—Treatment of respiratory catarrhs.—Tests of thyroid hypersensitiveness.—A diet sheet for nephritics.—Delayed arsenical poisoning	647
SURGERY.—Open treatment of fractures.—Treatment of crushed extremities.—Nerve injuries of the war.....	655
HYGIENE AND SANITATION.—Disinfection of tubercular sputum.—Syphilis in railroad employees.....	659
TROPICAL DISEASES.—Ulcerating granuloma.....	663
EYE, EAR, NOSE, AND THROAT.—Frontal sinus drainage.—Anesthetics in throat surgery.—Correction of nasal deformities.....	
NOTES AND COMMENTS:	
American Library Association.—Mental defects in the United States.—“Tea-taster’s” cough.—Scientific basis of carelessness.—“The case against the prophylactic packet.”—Treatment of leprosy.—Medical training in London.—A new Army and Navy Club.—The Navy Mutual Aid Association.—Medical school of the University of Virginia.—A new medical quarterly.—Solar therapy.—Novarsenobenzol subcutaneously.—Economic loss from rats.—The flight of mosquitoes.—A medical centenarian.—A French hospital ship.—Potassium-mercuric-iodide.—Dermatitis in industrial work.—Radium.—A twelfth century epitaph.....	669
REPORTS:	
ARSENICAL PREPARATIONS USED INTRAVENOUSLY.	
By Captain E. S. Bogert, Medical Corps, U. S. N.....	679
VENEREAL DISEASE IN THE DOMINICAN REPUBLIC.	
By Lieutenant J. W. Vann and Lieutenant B. Groesbeck, Medical Corps, U. S. N.....	681
AMERICAN LEGATION GUARD, MANAGUA, NICARAGUA.	
By Lieutenant Commander F. F. Murdock, Medical Corps, U. S. N.....	684
SANITARY CONDITIONS IN VLADIVOSTOK.	
By Lieutenant A. S. Judy, Medical Corps, U. S. N.....	689
HOSPITAL RECORDS.	
Commander H. W. Smith, Medical Corps, U. S. N.....	698
HOSPITAL RECORDS.	
By Commander E. U. Reed, Medical Corps, U. S. N.....	706
A DEATH FROM ETHER DUE TO STATUS LYMPHATICUS.	
By Captain A. W. Dunbar, Medical Corps, U. S. N.....	714
MEDICAL PROPHYLAXIS AGAINST VENEREAL DISEASES.	
By Lieutenant P. W. Dreifus, Medical Corps, U. S. N.....	715
BOOK NOTICES	718
INDEX	721

PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in parts as extracts) throughout the service, not only will they be employed to some purpose as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

W. C. BRAISTED,
Surgeon General, United States Navy.

v

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

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No. 4.

SPECIAL NEW YORK HOSPITAL NUMBER.

CERTAIN SURGICAL ACTIVITIES AT THE UNITED STATES NAVAL HOSPITAL, NEW YORK, FOR A PERIOD OF EIGHT MONTHS.

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¹ Lieutenant Commander F. H. Bowman, Med. Corps, U. S. Navy, one of the staff operators, was detached Sept. 26, 1919. No individual names are attached to any of the articles or reports for the reason that the entire surgical staff collaborated in the general work of the service and are collectively responsible for what has been done.

A SERIES OF INTERESTING BONE CASES.

The following series of bone cases is thought to be of sufficient clinical interest to warrant reporting, and to show as well the activities of the United States Naval Hospital, New York, along these lines. They include fracture reduction by both open and closed methods; the use of Lane bone plates; reamputation and the removal of dead bone, followed by Carrel-Dakin treatment; massage and mechano-therapy of the part and final bone graft.

The bone grafts were executed with the Albee technique, while the Carrel-Dakin treatment is described in an accompanying article.

For the assembling and printing of X-ray plates we wish to acknowledge the help and cooperation of Lieutenant C. C. Hugger, Medical Corps, U. S. Navy (T).

CASE: C. J. A. Commander, U. S. N. R. F. Age 43 years. He has had a knee condition for some time past which caused the knee to give way at times, and while going up the front steps of his residence his knee suddenly gave way when he was on the second step, and he fell to the pavement below with the entire weight of his body on his right arm, which was directly beneath him and at right angles to the pavement.

The resultant complicated Barton's fracture with four lines of fracture, impaction, and displacement, as shown in figure 1, was molded under ether anesthesia into the position shown in figure 2 and a posterior splint applied. His arm is still in a light splint with motion of fingers returning.

CASE: J. H. J. Ensign, U. S. N. (T). As the result of a collision between the U. S. S. *O-7* and a merchant ship, the *Lexington*, on October 6, 1919, he was thrown from the bridge of the *O-7* into the water, striking against the hull of his ship and sustaining multiple injuries, of which that of the right shoulder was the most severe. The accompanying X-ray (fig. 3) shows the extreme degree of comminution and displacement of fragments. On October 8, 1919, he was given a general anesthetic and the shoulder opened. It was obvious that any attempt toward reduction was impossible. The head of the bone and six large fragments were removed, the end of the shaft was rounded and placed within the joint capsule, and the capsule sutured around it.

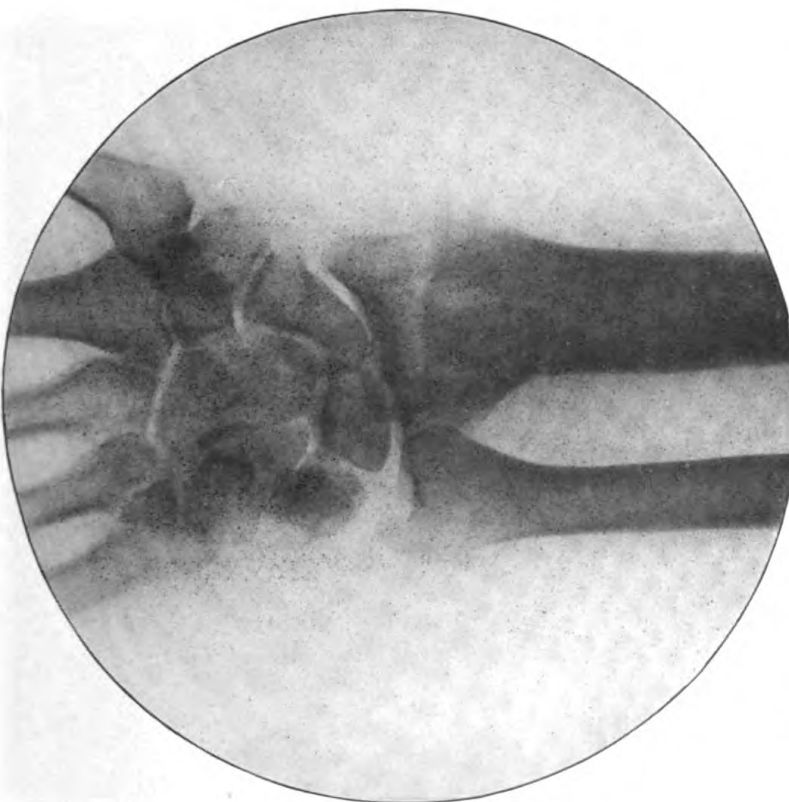


Fig. 1.—Case: C. J. A. Four lines of fracture with impaction and displacement.

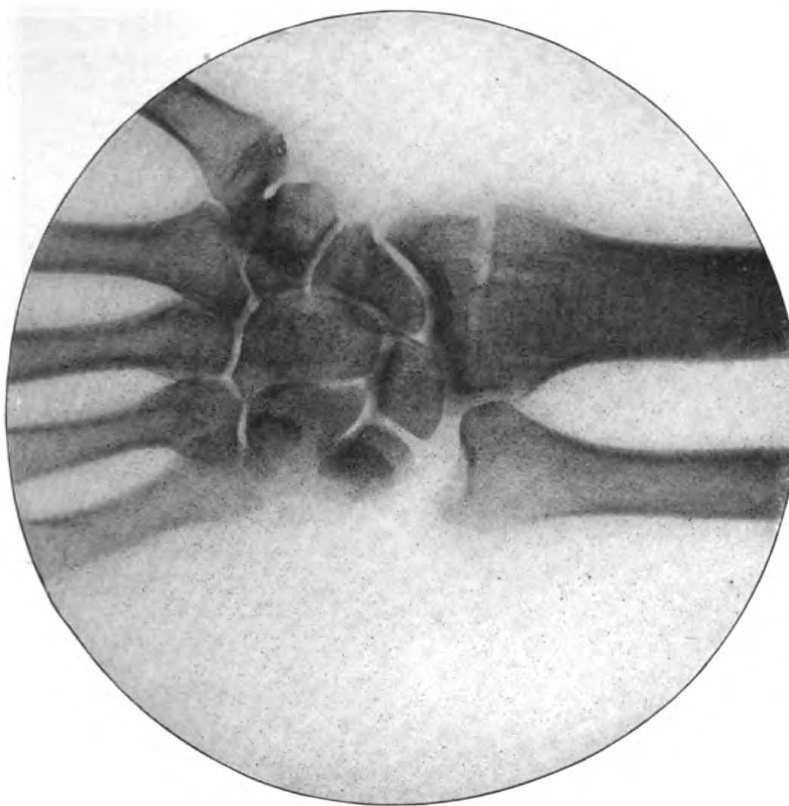


Fig. 2.—Case: C. J. A. Fragments molded into position for application of posterior splint.



Fig. 3.—Case: J. H. J. Comminuted fracture of upper humerus.



Fig. 4.—Case: J. H. J. Head of bone and six fragments removed. End of shaft placed within capsule. Good functional result.

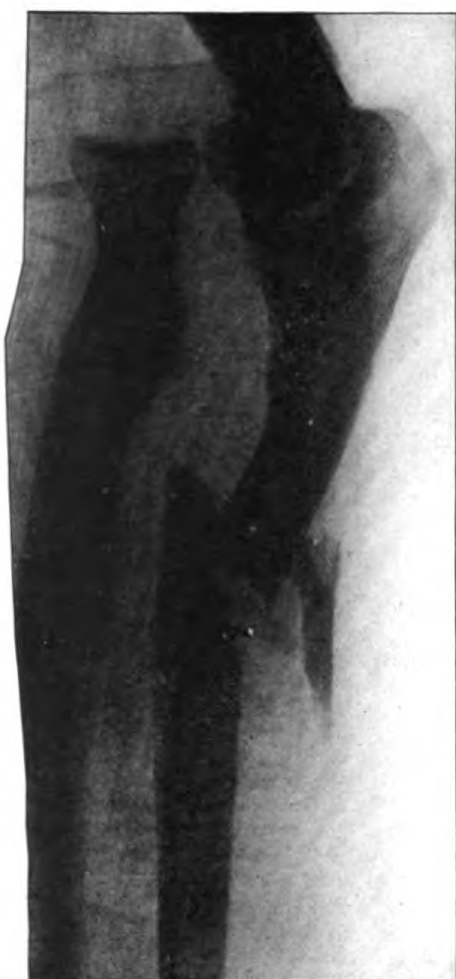


Fig. 5.—Case: M. D. Comminuted fracture, right ulna.

512-3



Fig. 6.—Case: M. D. Loose fragment used as a bone graft after reduction. Good union and function.

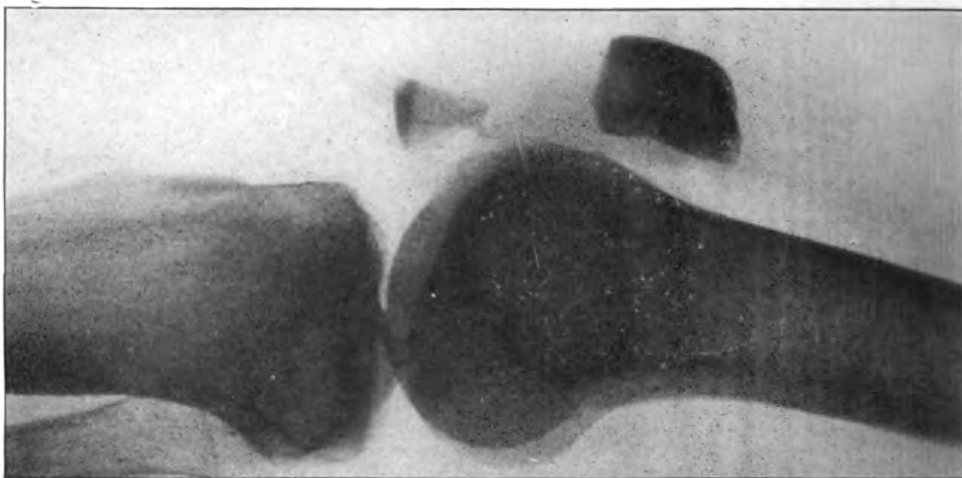


Fig. 7.—Case: R. F. A. Transverse fracture of patella.

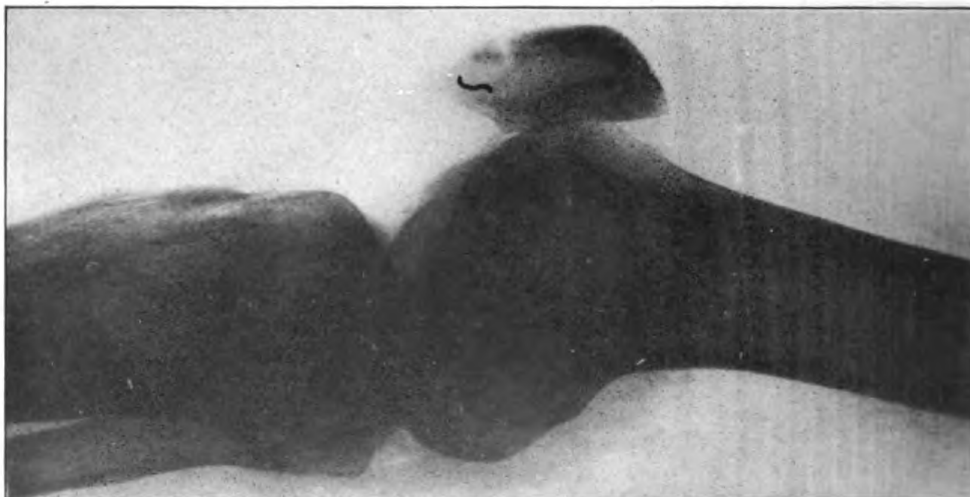


Fig. 8.—Case: R. F. A. Fragments tied together with kangaroo tendon. Capsule stitched with chromic gut.

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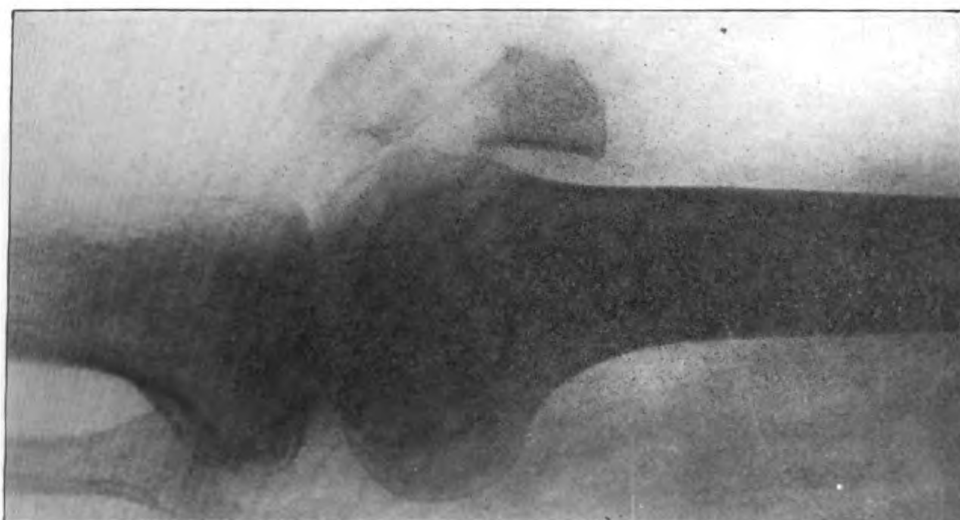


Fig. 9.—Case: A. B. Fracture of patella.

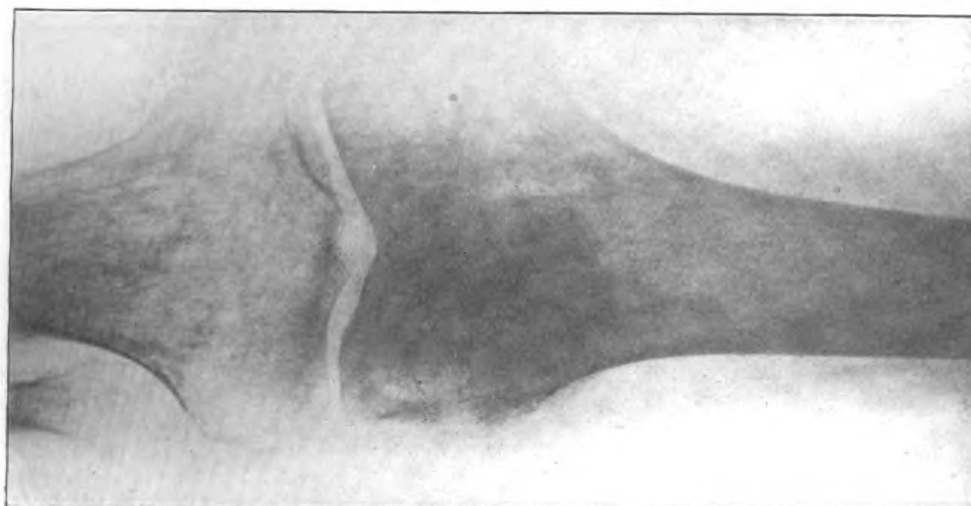


Fig. 10.—Case: A. B. Fracture of patella.

512-5



Fig. 11.—Case: A. B. Fracture of patella. Treated by plaster cast for five weeks followed by massage and passive motion.

March 25, 1920, examination showed forward and backward motion of the arm through about 5° , about 10° abduction, and a slight amount of circumduction. Motion about the elbow joint is normal, with muscle power of the forearm unimpaired. From the functional standpoint, he can write, feed, and dress himself. Figure 4 shows the end result.

CASE: M. D. C. B. M., U. S. Navy. Age, 35 years. While standing a wheel watch he was thrown against the side of the chart house and sustained a comminuted fracture of right ulna. (Fig. 5.) This was cut down upon, the ends of the bone brought into position, the loose fragment used as a bone graft and ligated into place with kangaroo tendon. (Fig. 6.) He has obtained perfect union and function.

CASE: R. F. A. Seaman, first class, U. S. Navy. Age, 24 years. February 27, 1920, fell on the ice at the receiving ship at New York, striking on left knee and producing a transverse fracture of the patella. He was placed in bed, with the leg elevated in a cast, and local heat was applied until swelling subsided. (Fig. 7.)

March 1, 1920, under ether anesthesia, the patella was cut down upon and drilled, the two fragments were tied together with two kangaroo tendons, and the capsule sutured with chromic gut. (Fig. 8.) March 11, 1920, 10 days later, and while patient was still in bed, the splint was removed daily and gentle active motion started. When the patient was allowed out of bed April 12, 1920, he had between 10° and 20° motion, and was able to walk about the ward with the aid of crutches. These were taken away from him as soon as he regained his equilibrium. He is now walking about with hardly any perceptible limp, and has about 50° motion of the knee.

CASE: A. B. Seaman, U. S. Navy. Age, 27 years. March 2, 1919, he fell on a wet deck and sustained a transverse fracture of left patella, which was treated at the British hospital, Buenos Aires, Brazil, by suture of the capsule. Upon his arrival in this hospital, June 27, 1919, examination showed good union, and that he was able to walk with but very slight limp.

July 2, 1919, he fell and sustained a second fracture of the patella, with much swelling and discoloration of the joint. (Fig. 9.)

August 5, 1919, after swelling had subsided, he was operated upon, and a double wedge-shaped bone graft from the left tibia transplanted into the patella. The leg was placed in a cast, which remained on until September 9, 1919, when massage and passive motion was started. (Figs. 10, 11.) The functional restoration of the joint was

very slow in this case, and it was not until January, 1920, that very marked results were obtained. At that time he had 50° motion and only a slight limp when walking.

CASE: E. J. T. Private, U. S. Marine Corps. Age, 25 years. Wounded in action, November 1, 1918, by high explosive shell, resulting in a compound fracture of left humerus. Admitted to this hospital March 18, 1919, with nonunion and discharging sinus. The sinus healed about April 1, 1919, but nonunion persisted.

May 22, 1919, X-ray showed partial regeneration of bone.

August 8, 1919, was operated upon, scar dissected out, two sequestra removed, and incision irrigated with Dakin's solution.

August 24, 1919, as sinus had not closed, arm was reopened and a small amount of dead bone removed.

December 5, 1919, reoperated and dead bone removed. (Fig. 12.)

January 15, 1920, showed wound healed. Massage and local application of heat was continued until scar was soft and pliable. (Fig. 13.)

March 17, 1920, a bone graft from the left tibia was transplanted into the humerus and the arm placed in cast. (Fig. 14.)

At the present time the patient has firm union with good callus formation.

CASE: P. L. R. Yeoman, third class, U. S. Navy. Age 23 years. On August 6, 1919, he was caught in a deck winch and sustained a compound fracture of left tibia and fibula. Admitted to this hospital September 18, 1919, and on October 22, 1919, was operated upon and considerable dead bone removed from the region of the fracture of the tibia. (Fig. 15.) He was placed upon Carrel-Dakin treatment and wound healed early in December, from which time he was given massage of the scar until April 22, 1920, when a bone graft from the opposite tibia was transplanted. (Fig. 16.)

CASE: T. W. J. Private, U. S. Marine Corps. Age 22 years. Received a shrapnel wound in left forearm on the Argonne front on November 12, 1918, which resulted in a compound fracture of the radius, osteomyelitis, and loss of substance. (Fig. 17.) He came to this hospital with wound closed except for slight sinus at lower end, which closed rapidly. Scar was massaged and baked until April 28, 1920, when a bone graft from the tibia was transplanted. (Fig. 18.) This operation was made difficult by the large amount of scar tissue and the loss of substance of soft parts, which necessitated undue tension on the skin, and a small area of this broke down, but is now closing in. The graft is still in situ and appears viable.

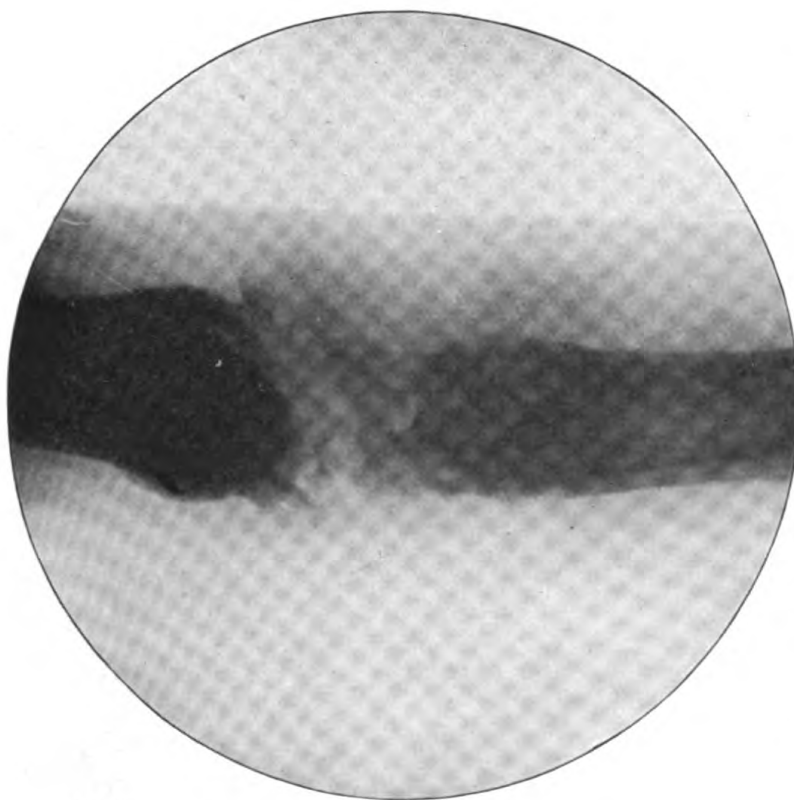


Fig. 12.—Case: E. J. T. Compound fracture of humerus; nonunion and discharging sinus. Dead bone removed.

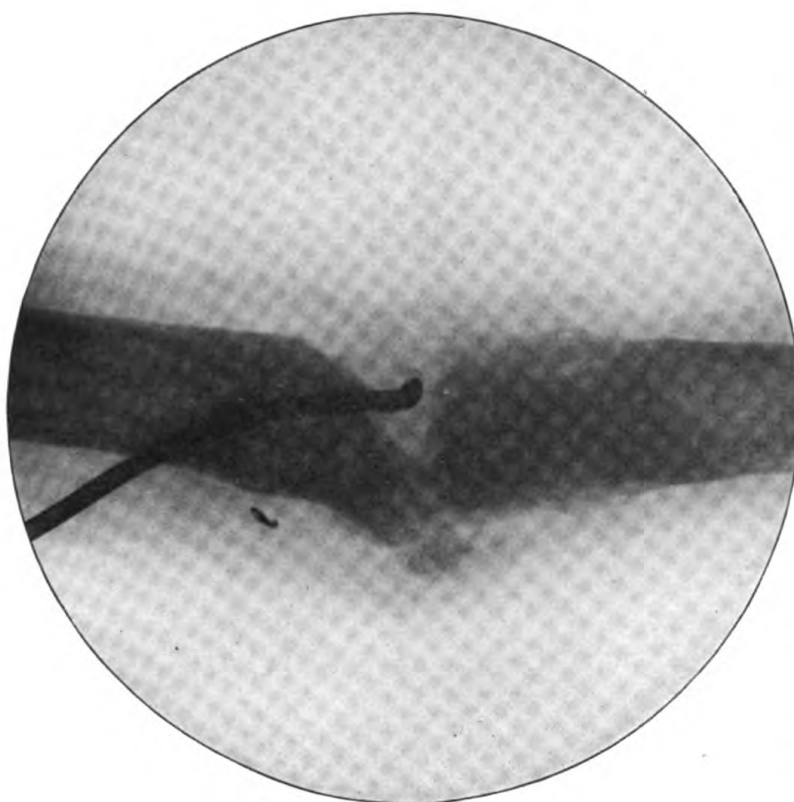


Fig. 13.—Case: E. J. T. Massage and external heat now used to soften the wound scar.

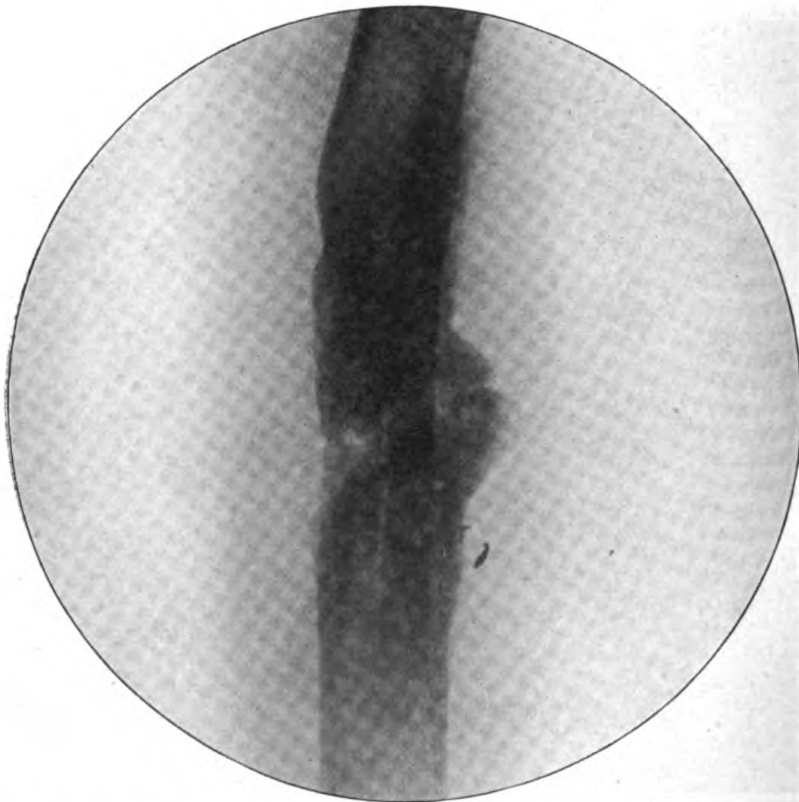


Fig. 14.—Case: E. J. T. Graft from tibia transplanted with resulting formation of good callus and firm union.

514-2

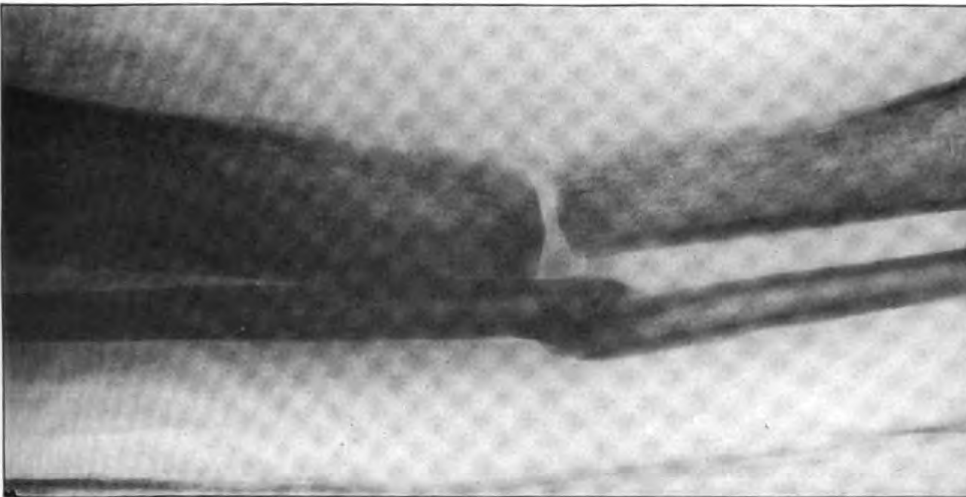


Fig. 15.—Case: P. L. R. Compound fractures of tibia and fibula. Dead bone removed.

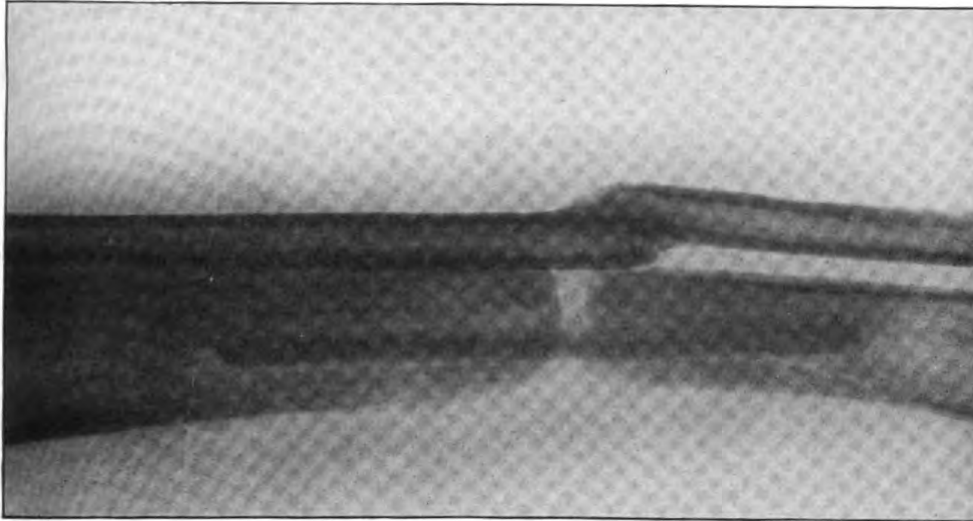


Fig. 16.—Case: P. L. R. Graft from opposite tibia transplanted.

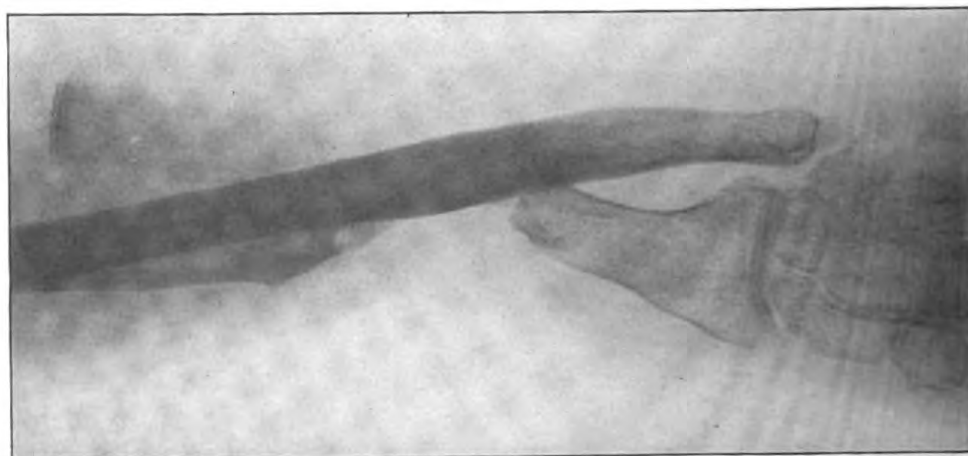


Fig. 17.—Case: T. W. J. Compound fracture of radius with osteomyelitis and loss of substance.

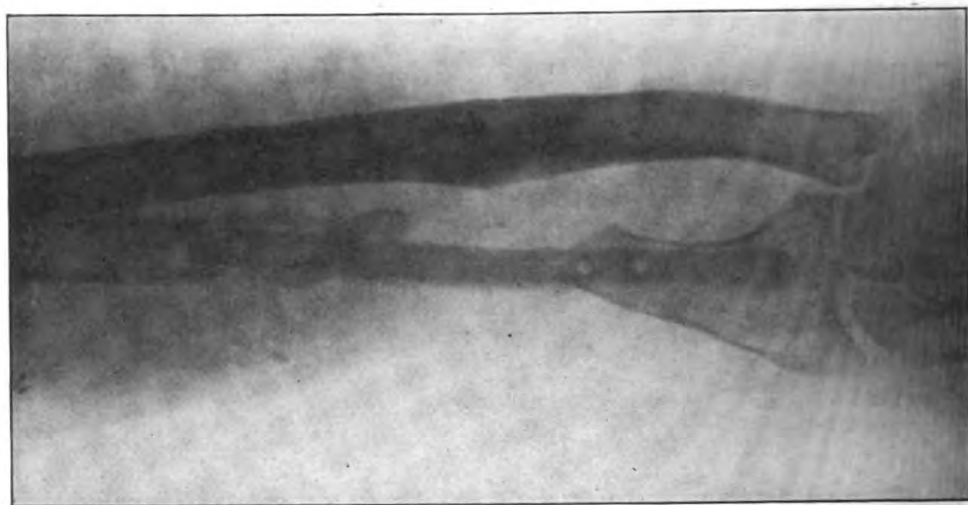


Fig. 18.—Case: T. W. J. Transplantation of bone graft from the tibia.

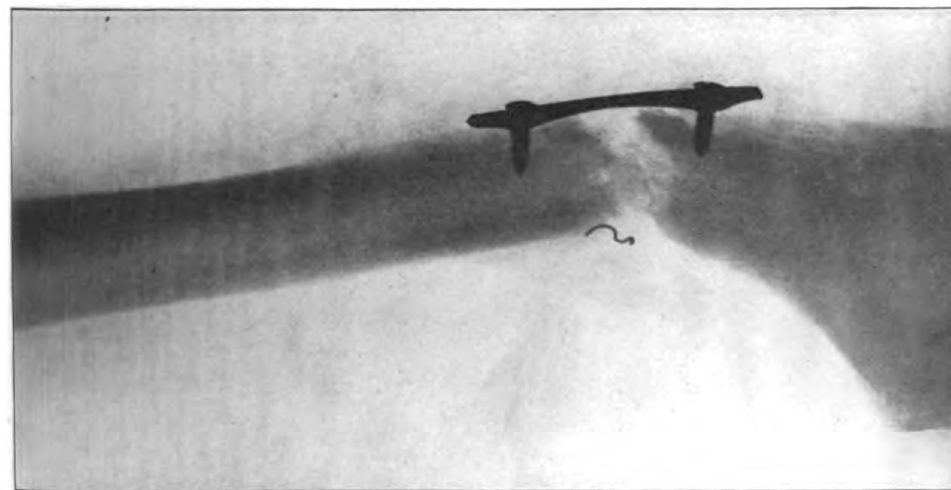


Fig. 19.—Case: T. W. N. Comminuted fracture, right humerus. First, treated unsuccessfully by bone plate. This and dead bone removed. Treatment by Carrel-Dakin technique. Grafting to follow.

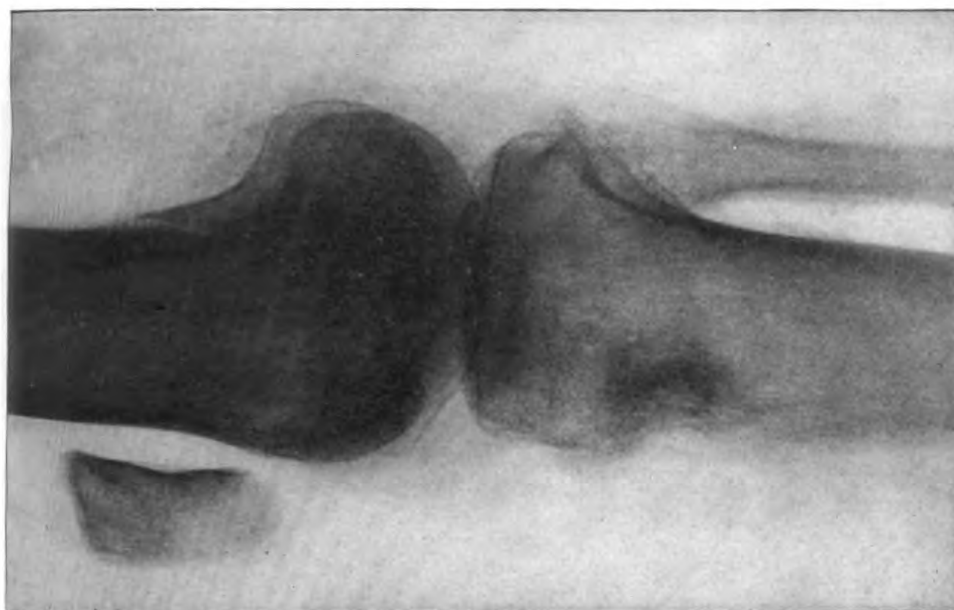


Fig. 20.—Case: T. W. N. Laceration of tibia which occurred concurrently with fracture of humerus. Operative interference not undertaken for fear of detaching patellar ligament.



Fig. 21.—Case: G. C. M. Amputation necessitated by crushing injury.



Fig. 22.—Case: G. C. M. Reamputation demanded by reason of ulceration of bone and lack of flap from original amputation.

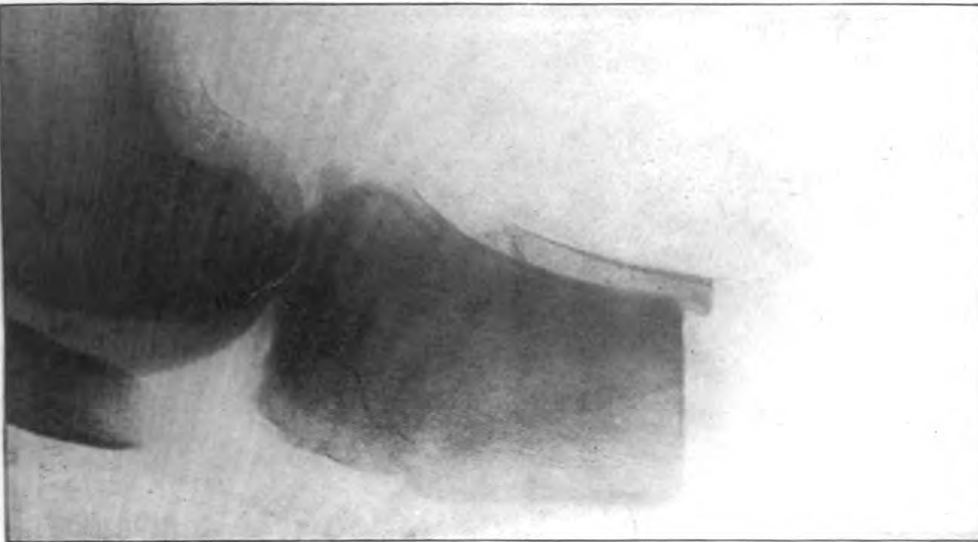


Fig. 23.—Case: F. R. O. Reamputation in a case of crushing injury necessitated by projection of fibular fragment beyond tibia.

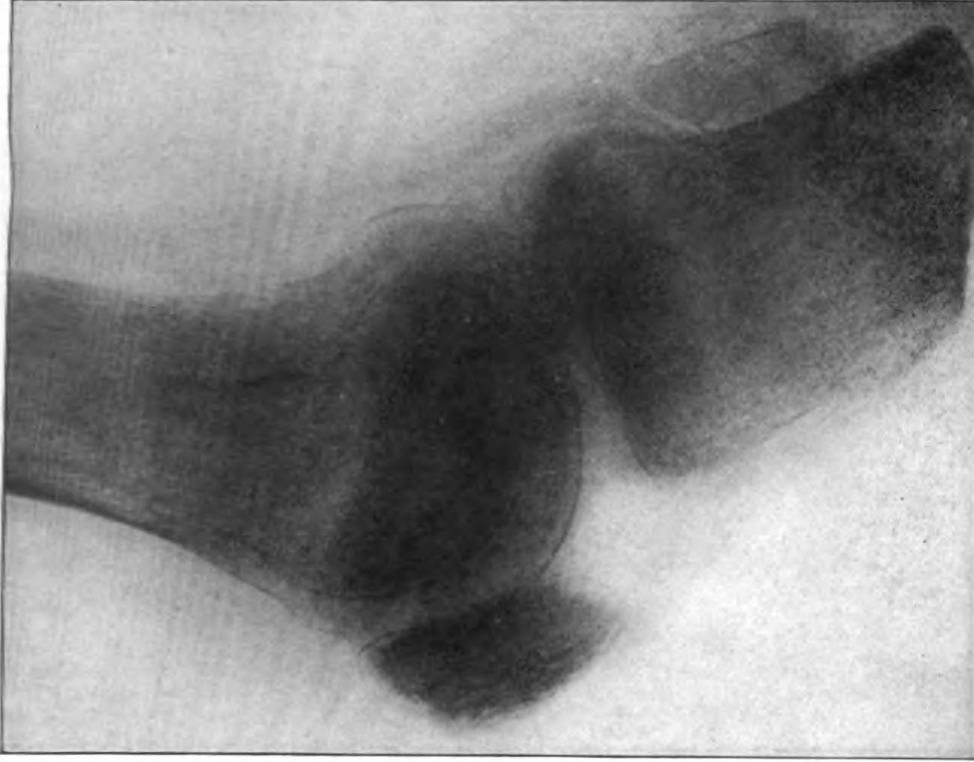


Fig. 24.—Case: F. R. O. Fibula shortened, tibia bevelled, and good flap obtained.

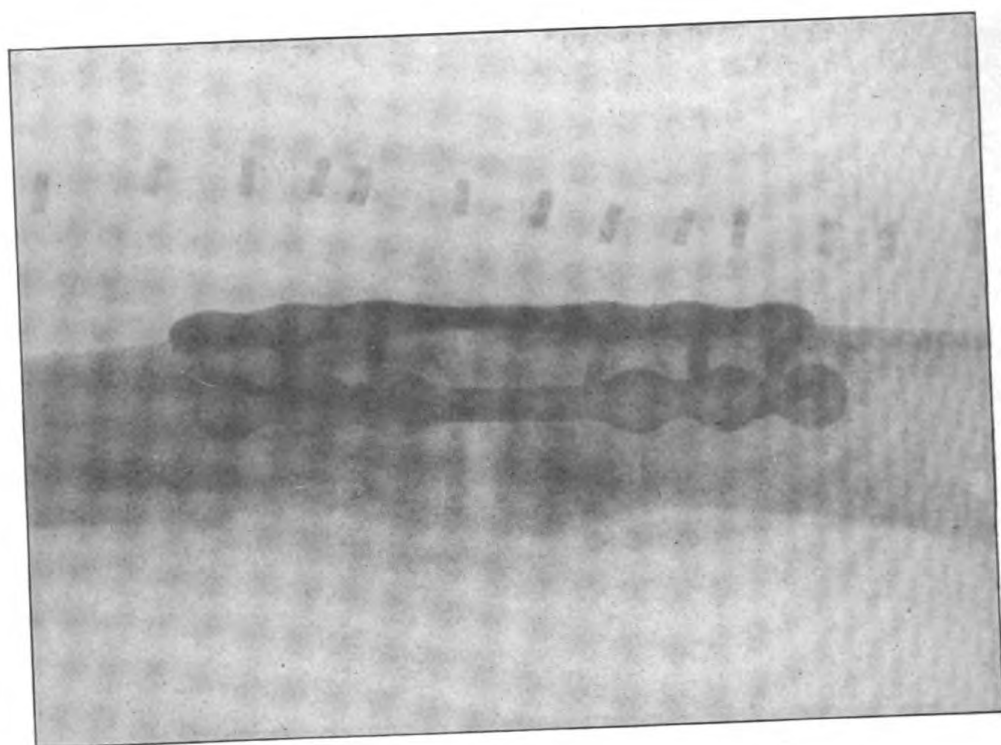


Fig. 26.—Case: J. F. G. Lane plates applied to fractured right femur.

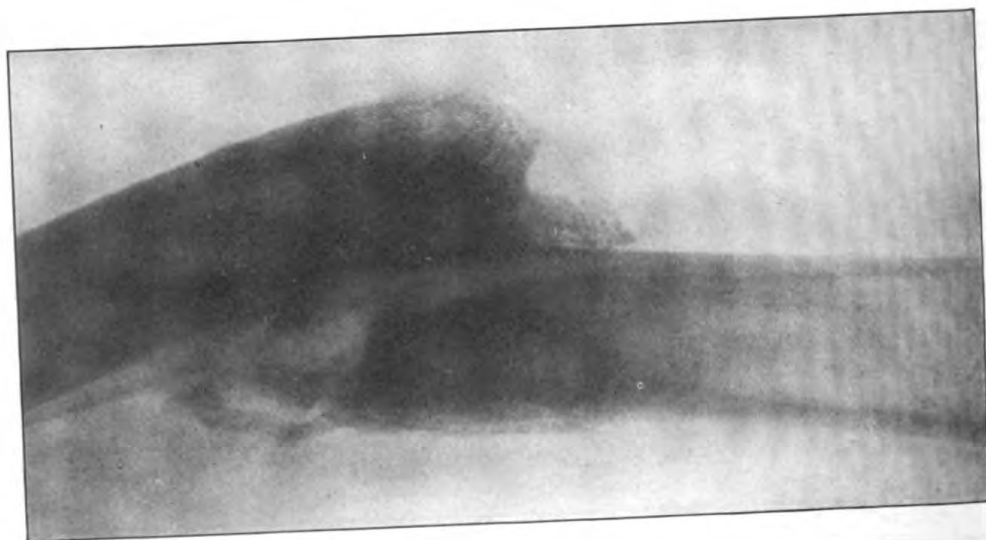


Fig. 25.—Case: J. F. G. Faulty union of right femur fractured by fall through a hatch.

CASE: T. W. N. Q. M. first class (aviation). Age 21 years. On December 11, 1919, while engaged in getting a mooring line off the *NC-4*, was struck by one of her propellers and sustained a comminuted fracture of right humerus, laceration with chipping off of fragment of tibia, just below right knee, and laceration of the scalp. He was removed to a civilian hospital, where the humerus was cut down upon, a fragment of the bone removed, and a bone plate applied. February, 1920, examination showed nonunion of humerus and a small area of infection with discharging sinus at lower end of scar. X-ray shows bone in poor apposition and loose bone plate.

These findings were confirmed on entrance to this hospital March 5, 1920. (Fig. 19.) The sinus closed April 26, 1920, and massage of scar was started. May 20, 1920, he was operated upon with the intention of removing the bone plate and attempting a bone graft, but pus was found about the lower screw of the bone plate upon its removal and the grafting abandoned. The dead bone was removed, and he is now receiving Carrel-Dakin treatment, and will subsequently be grafted.

The bone plate in this case did absolutely no good, acted only as a foreign body, and kept up the infection.

Figure 20 is included to show the inadvisability of further operative interference with the tibia for fear of detaching the patellar tendon.

CASE: G. C. M. Seaman, second class. Age 22 years. Received a severe crush on the left leg in an automobile accident April 15, 1919, necessitating an amputation at the junction of the upper and middle third of the tibia and fibula. On admission to this hospital the end of the tibia was ulcerated and exposed with absolutely no padding. (Fig. 21.) On May 13, 1919, the stump was reamputated, fibula cut off short, and end of tibia beveled, giving a good flap, as shown in figure 22.

CASE: F. R. O. Fireman, third class, United States Navy. Age 20 years. On February 10, 1920, while making a regular trip in his ship's steam launch, had his leg caught in a crank shaft and was badly crushed, necessitating amputation of left leg at its upper third. Examination at this hospital showed very poor flap, with sharp edge of tibia making pressure on the skin, and the end of the fibula longer than that of the tibia. (Fig. 23.) April 23, 1920, reamputation, with fibula cut off short, edge of tibia beveled, and flap improved, as in figure 24.

CASE: J. F. G. Seaman, second class. Age 23 years. On November 28, 1918, sustained multiple injuries, extreme, resulting from fall through open hatch. These consisted in a compound frac-

ture of left femur, a simple fracture of right femur, a dislocation of the left wrist, and laceration of the face.

December 11, 1918, left leg enormously swollen, blue, cold, and numb below the knee, with small area of gangrene on dorsum of left foot. The swelling subsided, but the gangrene progressed, and necessitated amputation at the junction of the middle and lower third of the thigh.

Admitted to this hospital March 25, 1919, with stump apparently healed and fracture of right femur united. April 5, 1919, he fell from a wheel chair and refractured his femur. This was reduced under ether upon a Hawley table and a cast applied.

July 29, 1919, stump began to drain and X-ray showed small sequestrum of left femur and faulty union of right femur. (Fig. 25.) October 2, 1919, stump operated upon and dead bone removed. It was treated by the Carrel-Dakin method and healed by October 25, 1919.

November 3, 1919, right femur was cut down upon, two Lane plates applied, and leg placed in cast. (Fig. 26.)

January 27, 1920, X-ray showed bone plate broken, but position otherwise good, with slight callus formation.

February 23, 1920, examination showed motion at site of fracture of right femur.

April 4, 1920, bone plate removed and graft from right tibia transplanted into femur. At the present time (two months later) there appears to be good union.

This case is of interest in that it shows a stimulation of osteogenesis and union from bone graft, after simple reduction and the use of Lane plates both failed to produce union. (Fig. 27.)

FRACTURES OF THE ANTERIOR TUBEROSITY OF THE TIBIA, WITH REPORT OF THREE CASES.

True avulsion fractures of the tibial tuberosity, with or without a portion of the condyle, represent rare injuries of the extensor apparatus of the knee joint and have been known for a long time, probably the oldest authentic case having been recorded by Key in 1827. To this purely traumatic group, Osgood in this country and Schlatter in Switzerland added in 1903 certain cases of relatively slight detachment of the tuberosity, which are not true avulsion fractures, and perhaps not always of traumatic origin. The resulting functional disturbance, according to Schlatter, is due to a partial or total separation of the beak-shaped process of the upper tibial epiphysis—namely, a fracture of the epiphysial process of the tibia; and he pointed out that the detachment of a small cartilaginous seg-

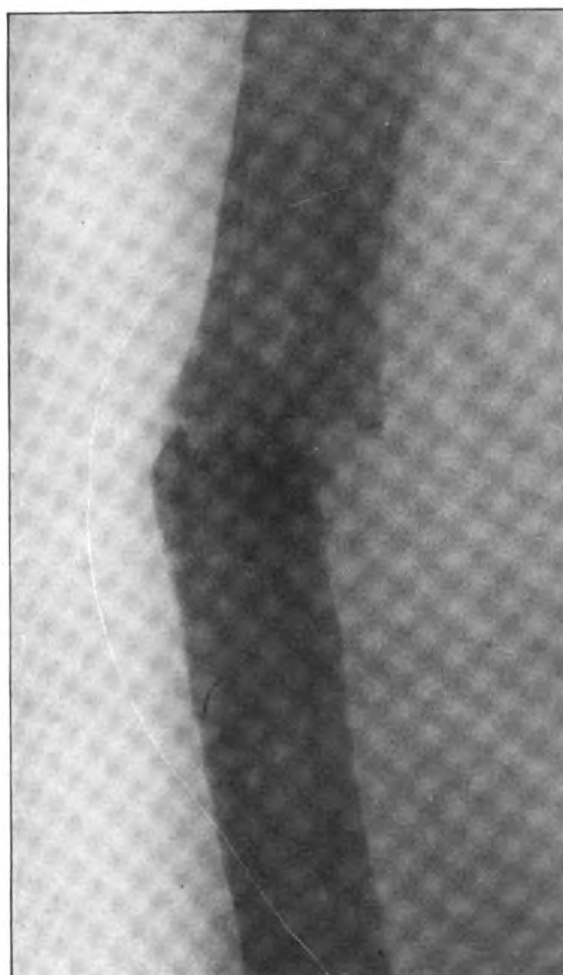


Fig. 27.—Case: J. F. G. Graft from tibia substituted for Lane plate which broke and permitted motion at seat of fracture. Good union finally obtained.

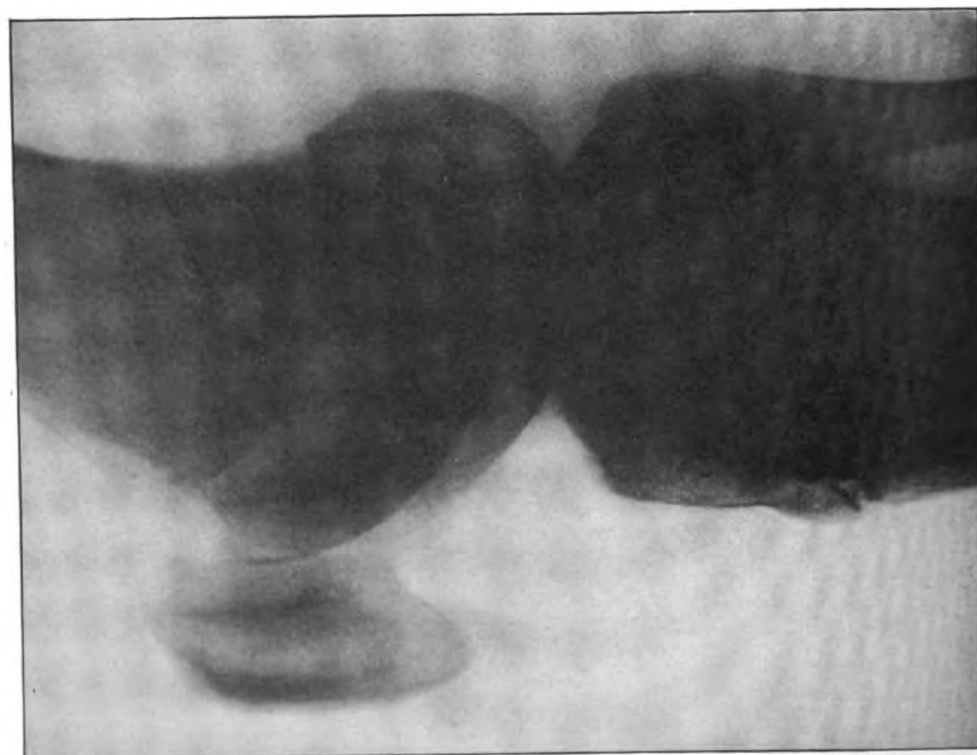


Fig. 1.—Case: M. L. Fracture of tubercle of tibia.

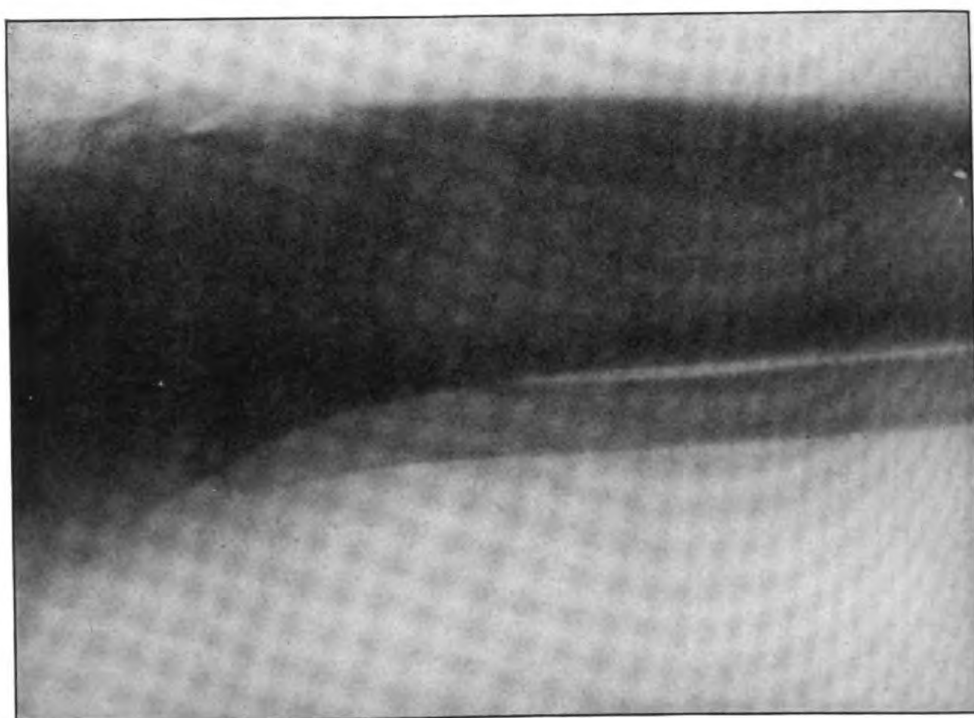


Fig. 2.—Case: S. L. Fracture of tubercle of tibia.

ment does not necessarily cause fracture symptoms like those due to fractures of fully developed bones. Osgood stated that these lesions vary in severity from a complete avulsion of the tuberosity to a slight separation of the tibial epiphysis. In the literature the condition figures also under the names of epiphysitis tibiæ dissecans traumatica adolescentium; acute epiphysitis; periosteitis tuberositatis tibiæ; apophysitis tibiæ; partial fracture of the tibial tuberosity; and as Osgood-Schlatter's disease.

The majority of the patients are youthful males, between 13 and 17 years of age, or slightly older. At this time of life the tibial tuberosity is formed by a beak-shaped process, which extends downward from the upper disk-shaped tibial epiphysis, to serve as an anterior covering of the tibial diaphysis. This beak-shaped process is at first purely cartilaginous. According to recent radiological findings, the ossification of the tuberosity is somewhat complicated, a bony nucleus and a beak-shaped bony process growing toward and finally uniting with each other. Milani, in 1919, pointed out that the ossification nucleus of the anterior tibial tuberosity does not unite with the diaphysis until between the ages of 18 and 24, rather later in life than was formerly assumed. After this age the bony union is so strong that it is impossible to tear the tuberosity away in the cadaver. Piersol states that the possibility of disjunction of the upper epiphysis of the tibia complicating an injury to the knee continues up to the twentieth year, at least.

The first two patients whose histories are herewith reported are good examples of true avulsion fracture of the tibial tuberosity. These two sturdy young seamen, 18 and 19 years of age, respectively, who had passed the physical examination for service in the Navy, can not very well be suspected of having been afflicted with latent bony changes from infectious or other nontraumatic causes. Moreover, the association of the tibial lesion with other fractures in one of the cases is additional proof of the purely traumatic origin of the fracture of the tibial tuberosity. The third observation illustrates the affection described as Osgood-Schlatter's disease. The condition present is shown in the radiograph, and a picture of the normal knee of a sailor of the same age is added for comparison.

(1) M. L. Seaman, second class, 19 years of age. November 15, 1919, injured left knee by direct violence—impact of an empty salt-water soap box—while at work on deck. Knee felt sore, but did not cause special discomfort. A week later knee became swollen and somewhat painful. Over the head of the tibia there appeared an area of ecchymosis. December 8, 1919, admitted to the sick bay of the U. S. S. *Pennsylvania* with a large, fluctuating swelling of the left knee, painful when walking. December 9, 1919, admitted to the United States Naval Hospital, New York. Knee swollen and tender.

X-ray showed fracture of tubercle of left tibia, as shown in picture. Treatment: Rest with leg elevated.

January 2, 1920. Swelling gone; allowed to walk about with use of cane and tight piece of strapping directly over tubercle of tibia.

February 1, 1920. Elastic kneecap. Discharged to duty.

(2) S. L. Seaman, second class, 18 years of age. January 13, 1920, contusion of left knee from leg being caught in towline, throwing him to deck and causing a Colles fracture of right arm and injury to left knee. X-ray showed fracture of tubercle of tibia.

January 20, swelling of knee gone. Leg elevated and pressure applied over tubercle of tibia.

February 1, 1920, up and about the ward.

(3) P. C. Seaman, second class, 20 years of age. No history of traumatism. Admitted to naval hospital with subacute articular rheumatism of two or three weeks' standing. Routine radiography of the knee region revealed thickening and osteoporosis in the form of a moth-eaten appearance at the base of the tibial tuberosities, which were partially detached. This discovery was purely accidental, as there had been neither traumatism nor clinical symptoms except slight tenderness of the left tibial tuberosity, pointing to the existence of Osgood-Schlatter's disease, which was undoubtedly present.

Our third case, which entered the naval hospital with subacute articular rheumatism, and in which radiography showed a partial detachment of the tibial tuberosity, resembles in several respects a case reported by Alexis Thomson as a marked example of Osgood-Schlatter's disease in a schoolboy of 15 years. The patient had been told by some of the doctors consulted for the undue sensitiveness at the upper end of the shin bone of both legs that it was rheumatism; others interpreted the condition as housemaid's knee; and still others suspected tuberculous bone disease. Considerable irregularity of the downward tongue-like prolongation of the upper epiphysis of the tibia was shown in the X-ray pictures. The ossification was nearly complete, but had taken place irregularly, and there was a want of continuity between the tongue-like prolongation and the epiphysis itself, the gap being probably occupied by cartilage. There was no trace of rickets in the other epiphysial junctions in the region of the knee.

An additional case of true Osgood-Schlatter's disease:

(4) J. G. N. Seaman, 22 years of age. Traumatism to right knee, some contusion of soft parts with external dislocation. X-ray revealed osteoporosis of the tibial tuberosity without any symptoms. Left knee same condition; no injury, no tenderness, or other symptoms. If the patient had not dislocated his knee the osteoporosis would not have been discovered.

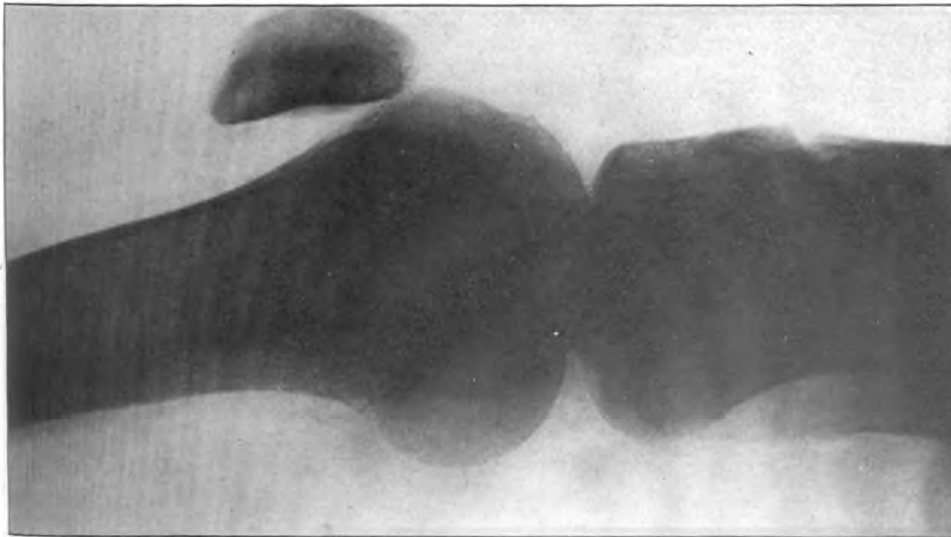


Fig. 3.—Case: P. C. Motheaten appearance of base of tibial tuberosities which are partially detached.

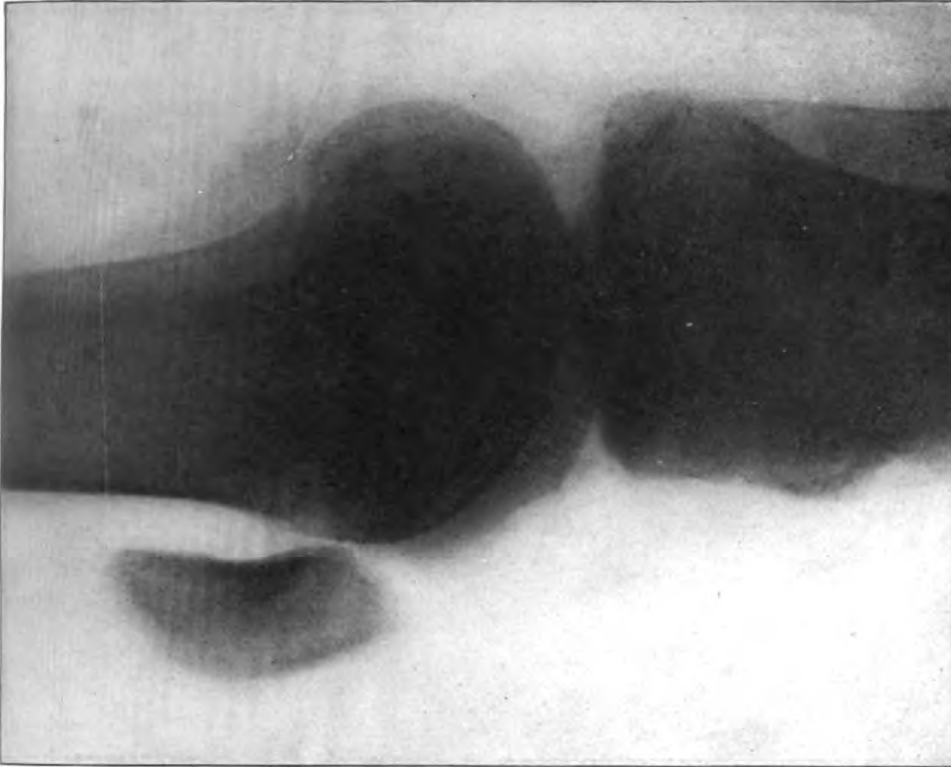


Fig. 4.—Case: P. C. Irregularity of contour of epiphysis, tibia; partial detachment of anterior tuberosity.

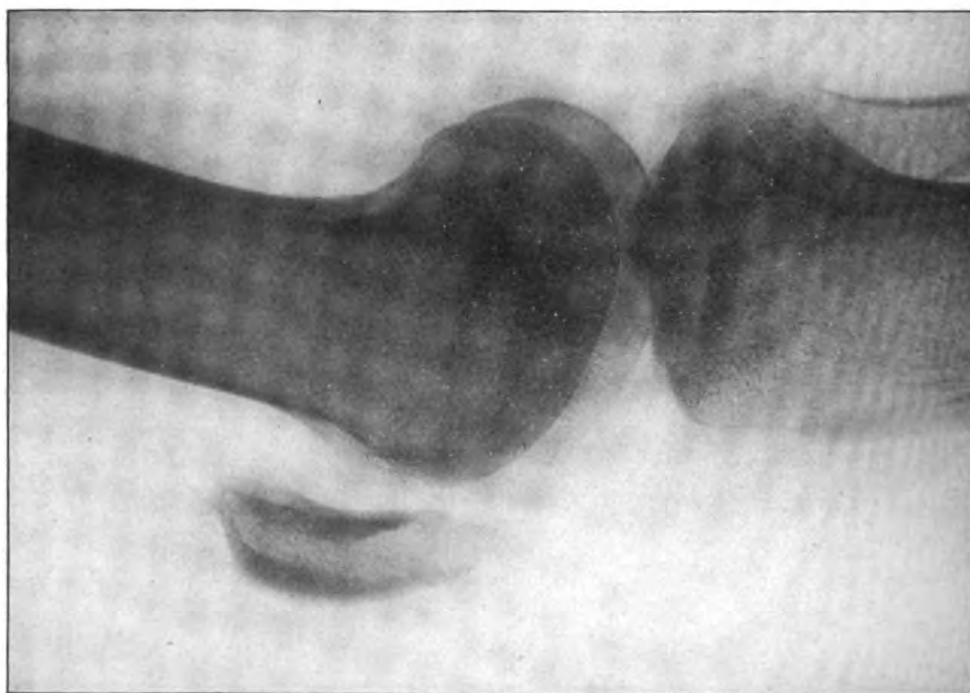


Fig. 5.—Normal tuberosity.

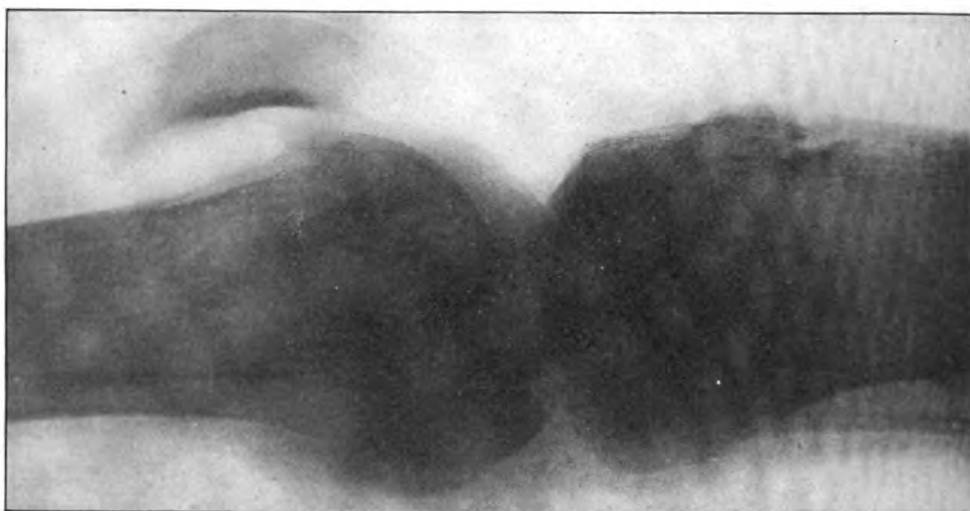


Fig. 6.—Case: J. G. N. Osteoporosis of tibial tuberosity without symptoms.

The establishment of the correct diagnosis and proper nomenclature in these cases is especially important in view of the lack of conformity which prevails in the literature as to the traumatic or inflammatory etiology of so-called Osgood-Schlatter's disease, under which heading different cases have sometimes been reported. The Swiss and American surgeons, after whom the condition is named, have always maintained its traumatic origin, but unfortunately a number of cases have been thrust into the literature under this heading which are not traumatic at all, but referable to osteochondritic changes and delayed ossification of the tibial tuberosity in youthful individuals between 13 and 15 years of age. To add to the confusion, other cases of genuine fracture of the tibial tuberosity have been reported under the same heading. The Index Medicus attempts a division by grouping the numerous references under (*a*) avulsion and fracture of the anterior apophysis of the tibia, and (*b*) thickening of the anterior apophysis of the tibia, or Osgood-Schlatter's disease. This arrangement has been followed in the list of references appended to this report.

Upon the basis of actual facts, as revealed by modern diagnostic procedures, such as radiography and occasionally by post-mortem findings, it seems correct to speak of a true avulsion fracture when the existing lesion has been produced through a distinct traumatism, in the presence of a normal ossification of the tibial tuberosity. When, on the other hand, the condition develops, with or without fracture, prior to the completion of bony fusion of the tuberosity, or in the presence of apophysial thickening and local bony changes, the term Osgood-Schlatter's disease is applicable. In this connection Alexis Thomson points out that the tibial tuberosity sometimes has an entirely separate center of ossification and forms a distinct epiphysis. He is inclined to believe that the affection known as Osgood-Schlatter's disease occurs with special frequency in boys or young men in whom the tongue-like process of the tuberosity has a separate center of ossification. A lack of continuity between the tongue-like process of the tuberosity and the upper epiphysis of the tibia, therefore, must not be confused with the totally different lesion of fracture of the tongue-like process after ossification has taken place.

In England, the home of athletic school games, the condition called after Osgood and Schlatter was formerly well known under the name of "Rugby knee." Thomson states that it was recognized as a bar to taking part in military drill because of the incapacity to kneel on the affected limb, and adds that the rounded projection which characterizes the affection may persist throughout life.

There is a tendency on the part of recent authorities, supported by the findings on X-ray examination, to refer the cases of so-called Osgood-Schlatter's disease to a rarefying osteitis and ossifying peri-

osteitis, comparable to late rickets. The occasional bilateral occurrence of the affection and the denial of traumatism on the part of some of the patients apparently point in the same direction. Of eight cases reported by one observer, all in growing boys between 13 and 14 years of age, only two gave a history of traumatism, which was moreover doubtful. An Italian investigator (Pieri, in 1912) assumed two varieties of Osgood-Schlatter's disease, one being caused through traumatism, the other originating through a dystrophic process of the tibial tuberosity, reserving the name of Osgood-Schlatter's disease for the cases due to imperfect ossification or osteoporosis of the tibial tuberosity. In the presence of an abnormal osteoporotic tuberosity, a slight regional traumatism will often suffice to produce a fracture.

Undoubtedly there are some cases not attributable to traumatism, but their detailed consideration does not fall within the scope of this report. In cutting down upon the painful and enlarged tibial tuberosities in a boy of 14 years, in whom the affection was bilateral, Winslow found thickening of the periosteum and softening of the cartilage. In five of eight cases studied by Kienböck the radiological findings closely resembled osteochondritic changes, whereas there was no radiological evidence of fissure or fracture. The differential diagnosis between fracture and disease of the tibial tuberosity can not always be rendered, in view of the similar findings on examination and the practically identical clinical symptoms. Radiography, although by no means infallible, seems most promising for the recognition of the cause in a given case. In the pictures of our positively traumatic cases the separation of the tibial tuberosity is very evident.

In view of the above-outlined considerations, together with the fact that the naming of any disease after the man who first described it, is confusing and objectionable, the recommendation of Kienböck is well founded, that severe traumatic lesions in this region in youthful individuals past the age when the tibial cartilage normally ossifies (about 15 years) should be reported as fractures of the tibial tuberosity, with or without a portion of the condyle. This denomination is entirely applicable to the two cases which came under observation at the same time in the naval hospital.

Anatomy.—The tuberosity of the tibia is a triangular prominence on the front of the upper end, the top being about an inch below the upper end of the bone; it is lost below in the ridge of the front of the shaft.

Pathogenesis.—The mechanical cause of avulsion fracture of the tibial tuberosity consists of direct or indirect traumatism of the region of the knee, the later being responsible in the great majority of the cases. Direct traumatism may be incurred by falls or blows upon the

knee, often combined with a backward movement of the upper part of the body. Indirect traumatism is referable to frequently repeated forcible contractions of the quadriceps muscle; for example, in football players.

Through its position and anatomical character the tibial tuberosity in able-bodied and active young men is naturally rather exposed to traumatism from simple contusion to partial or total fracture. Predisposing factors in the opinion of Peteri (1915) are as follows: Normal but incomplete ossification, in growing boys, and severe traumatism; in the presence of an irregular ossification process, even a minor traumatism may produce these changes; when the periosteum has been loosened in consequence of a pathological (inflammatory) process, a sudden strong contraction of the quadriceps muscle may suffice to separate it from its regional attachment.

As compared to the relatively large number of mild cases reported as Osgood-Schlatter's disease of traumatic and inflammatory origin, severe fractures of the upper tibial tuberosity are not apparently of common occurrence, although perhaps more frequent than usually assumed. It is a condition which must be kept in mind and which without careful examination is apt to be overlooked. Its frequency is indicated by Schlatter's claim to have observed seven cases in less than three years. In persons past 16 considerable traumatism is probably needed to produce the lesion, for at this age the tuberosity undergoes bony fusion with the tibia. The highest portion of the ossification nucleus unites first; and until the union is complete the lower portion of the nucleus remains separated from the diaphysis, appearing in profile view like a large beak turned downward. The mechanism of avulsion fracture usually is a sudden overstretching of the extensor apparatus of the knee due to forcible flexion, with simultaneous spastic contraction of the quadriceps muscle, as mentioned above. The patients are usually boys or young men in whom the fracture often occurs through excessive muscular contraction during some form of athletics, or as a result of direct violence, as in the young seamen under our personal observation.

In reporting a case of fracture of the tibial tuberosity, together with a portion of the condyle, in an unusually well-developed lad of 15 years, Kienböck calls attention to the fact that severe regional injuries due to traumatism seem to occur with special frequency in individuals between 15 and 17 years—an age at which a large bony tuberosity is already present and united with the epiphysial disk. Slight regional lesions, such as contusions or partial fractures, must be distinguished from severe injuries in the form of avulsion fracture of the entire tibial tuberosity, with or without a portion of the condyle. In the literature all these cases are intermingled, and different

forms appear under the same headings. Schlatter himself included among his observations on the condition which bears his name the case of a youth of 17 years who had slipped and fallen four weeks previously. He at once experienced a severe pain and was unable to get up and walk. The entire leg became swollen and the tibial tuberosity was very prominent. Radiography showed a cleft between the strong tibial spine and the diaphysis, the lower extremity of the process being over 1 cm. distant from the shaft. Thus there evidently existed a severe, distinct fracture of the entire well-developed tibial tuberosity, in the form of an incomplete avulsion fracture. The disturbances immediately after the accident were grave enough to permit a distinction from the milder cases of incomplete separation of the beak-shaped process of the upper tibial epiphysis. Kienböck thinks that Schlatter erred in adding this case to his other observations, all of which concerned much less serious injuries.

Symptomatology and diagnosis.—Simple contusions of the normal or inflamed tibial spine and severe regional injuries with avulsion-fracture of the tuberosity, in which a portion of the epiphysial tibial condyle is not infrequently involved in the fragment, can often be differentiated upon the basis of the clinical findings. In the first-named group the patient is usually a boy of 13 to 15 years who gives a history of slight traumatism, such as a simple fall; there is no inability to walk immediately afterwards; the pain is not particularly severe; the knee joint is not swollen, and the patella is not displaced upward. Massive fractures of the tibial tuberosity, on the other hand, occur in older boys of 16 or 17 to 20 or thereabouts as a result of severe traumatism; for example, a fall sustained in jumping from a more or less considerable elevation. Inability to walk and severe pains are present; the knee joint is usually swollen, due to edema of the soft parts and especially to bloody extravasation into the knee joint, usually because the bony fracture extends into the joint, a portion of the condyle being likewise broken off. Within the first few hours after the accident, before a large swelling has formed, a movable fragment, with crepitation, is sometimes palpable. The patella is displaced upward by about 1 to 2 c. m. in incomplete, and about 3 to 10 c. m. in complete, avulsion fractures of the tibial tuberosity. Movements of extension are interfered with to a variable degree, being entirely inhibited in total avulsions, and more or less imperfect and painful in partial separations. Recognition of the condition present is assisted by the demonstration of local tenderness on pressure, and sometimes of the displaced bony nucleus.

Bowser suggests that though the initial lesion may be a fracture or displacement of the tongue-like process of the epiphysis, yet the clinical symptoms, which are clearly inflammatory, may be due to the irritation of the growing osseous tissue caused by the contrac-

tions of the quadriceps in consequence of the fragment of bone into which the tendon is inserted having become loosened from its attachments.

Separation of the tibial tuberosity must be differentiated from fracture of the patella. Piersol points out that in disjunction the patella is drawn upward, the patient is unable to extend the leg, and the swelling following laceration of the subligamentous bursa may simulate swelling of the knee joint. The latter may be involved directly, as the synovial membrane is in close proximity to the tuberosity; or indirectly, through the occasional, though rare, communication with the subligamentous bursa. In separation of the tuberosity, crepitus can be elicited only by pulling the fragment downward; the outline of the patella is normal and can usually be made out.

According to the location of the fracture line and the existing amount of displacement, the following types may be distinguished: (1) Avulsion fracture of the tibial tuberosity, together with a portion of the condyle; (a) with complete separation and marked upward displacement of the fragment; (b) with incomplete separation, hence simple deviation of the fragment sideways or upwards. (2) Isolated fracture of the tibial tuberosity as a whole, with incomplete or complete separation, the latter associated with a marked upward displacement. A milder lesion is represented by fracture of a portion of the tibial tuberosity, with complete or incomplete separation of the fragment, upward displacement being slight or absent. In very young individuals, the extremity of the tibial tuberosity is more apt to become detached, whereas in older persons the entire process is fractured at the base (Schlatter). Transition forms between the different fracture types are not uncommon.

Incidence.—The actual frequency of these cases is difficult to estimate. According to Saar (1914), by far the most common injury of the lower extremity in football players consists of a lesion of the tibia in the region of the tuberosity. Although most common in this form of sport, fracture or separation of the anterior tibial tuberosity also occurs frequently as a result of all kinds of jumping. Sonntag compiled 38 such cases from the literature, among which a complete avulsion of the tuberosity was found to be twice as common as incomplete separation.

Six post-traumatic cases were recently reported by Altschul (1919), one of which could be kept for a long time under clinical and radiological control. A comminuted fracture of the tibial tuberosity was present, which gradually healed. Kurlander (1918) observed a case of simultaneous comminuted fracture of the tuberosity and upper anterior surface of both tibiae, the result of a fall on the curb-

stone, in a young man of 17 years. The demonstration of the exact condition present required careful X-ray work, illustrating the tendency of injuries of this kind to escape detection.

Treatment.—Rest; with elevation of the leg and pressure over the tibial tuberosity, proved successful in the cases under my own care. Bone suture is occasionally indicated. Pieri, in Italy, treated fractures of this kind successfully without bloody intervention, by means of two weeks' rest, followed by the application of a plaster kneecap during the daytime for several weeks longer, in order to exclude the action of the extensor tendon. Stimson says that the treatment is to press the fragment into place and maintain it by a bandage or strips of adhesive plaster, while the limb is kept extended upon a splint for four or five weeks. In a few cases the fragment has been exposed by incision and secured in place with periosteal sutures or even by temporary nailing, as in Ogilvie Wilk's case, where the detached tuberosity was fastened to its shaft by means of a steel pin; the functions of the limb were completely restored after three months.

Prognosis.—The prognosis of fracture of the tibial tuberosity is good, function being usually restored in the space of a few weeks; sometimes longer. The milder cases will recover under simple fixation of the knee and prolonged abstinence from violent exercise. Other cases prove very obstinate, however, and require several months for the restoration of function. The ultimate result, according to Stimson, has been good in all the cases, but in one the restoration of function was not complete until after a year. Haglund, a Swedish naval surgeon, mentions the case of a naval cadet who had injured one of his knees in this manner. The question arose whether he was to be allowed to remain in the Navy or not, and it was with the greatest difficulty the naval authorities were at last persuaded that the leg, though slow to improve, would ultimately get perfectly strong and well. Injury of the tibial epiphysis, in addition to fracture of the tuberosity, in youthful individuals will interfere more or less seriously with the normal growth of the bone, according to the age of the patient and the severity of the traumatism.

The occasional occurrence of fracture of the tibial tuberosity in older individuals, in whom the bony fusion is usually extremely solid, is shown in an observation of Neild's on a captain in the British navy, 45 years of age, who had sustained several traumatisms of his right knee and presented a large hematoma below the joint in front of the upper end of the tibia. An X-ray picture showed the patella displaced upward and the upper part of the tibial tuberosity torn off. Surgical intervention, with exact alignment of the three fragments by suture, proved so successful that the patient was enabled to return to sea three months after the operation, and does not find it necessary to wear a bandage or knee cap.

These various observations have been put together with the object of showing that suitable treatment of avulsion fractures of the anterior tibial tuberosity may be confidently expected to result in complete restoration of function.

SUMMARY AND CONCLUSIONS.

(1) Report of two cases of avulsion fracture of the anterior tuberosity of the tibia in young men past the age of ossification of the cartilaginous beak-shaped process of the upper tibial epiphysis. Report of one case of Osgood-Schlatter's disease.

(2) Recommendation that the term avulsion fracture of the anterior tibial tuberosity be reserved in future for those cases in which the existing lesion is the result of distinct traumatism, in the presence of a normally ossified tibial tuberosity. The name Osgood-Schlatter's disease is applicable to other cases in which the condition develops, with or without fracture, prior to the completion of bony fusion of the tuberosity, or in the presence of apophyseal thickening and local bony changes. What has come to be known as Osgood-Schlatter's disease is probably a condition of inflammatory (infectious) origin, and it is therefore inaccurate and objectionable to report under this heading instances of traumatic avulsion fracture of the anterior tibial tuberosity.

(3) Presentation of a selected comprehensive though not exhaustive bibliography, in which, for the convenience of readers, contributions in English are largely represented. In conformity with the recommendation made under (2) the articles have been grouped, as far as practicable, under the headings where they properly belong, according to the author's mode of interpretation of the existing bony lesions.

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THE CARREL-DAKIN TECHNIQUE IN THE TREATMENT OF EMPYEMA.

This study of the Carrel-Dakin method of treating empyema comprises a series of 18 cases, mostly of the postinfluenzal type, in which we tried to adhere strictly to the technique of its originator. We were fortunate at the beginning of the work in having Dr. A. H. Ebling, who assisted Dr. Carrel in his work at the Rockefeller Institute, pay us frequent visits and spend much time helping us develop our technique. During the height of our work we were favored by two visits from Dr. Alexis Carrel, who expressed himself as well pleased by our methods and results.

The Dakin solution was made fresh daily in our laboratory by the tank chlorine gas method and its titer marked on the container, so that at all times a check was kept on the strength of the solution. On two occasions the titers of our solution and reagents were tested at the Rockefeller Institute to insure their conformity to the standard.

The initial procedure in all cases consisted in resecting from 2½ to 3 inches of rib under local novocaine anesthesia; the breaking down of all adhesions so as to convert all into one cavity, for if pocketing occurs not only would the hypochlorite solution be not so evenly distributed to all parts of the empyema cavity but also its solvent action might open up a walled-off pocket and cause reinfection from within; and in the packing of the cavity with gauze to control hemorrhage. In some cases the Carrel tubes were placed in

situ at the time of operation and in others when the packing was removed.

The primary packing was removed in from two to five days, depending upon the character of hemorrhage from within the cavity at the time of operation, and the starting of routine dressing. This consisted in the daily washing of the surface of the incision and the surrounding skin with neutral soap and water, followed by alcohol and ether; protecting the skin with strips of vaseline gauze; placing a loosely packed strip of the Dakin soaked gauze in the incision, both to prevent premature closure and to retain the solution within the cavity; covering this with a layer of dry fluff gauze, and placing over all a combined pad of absorbent and nonabsorbent cotton with the nonabsorbent side out. This outer dressing was changed as frequently as was necessary, and this method kept the skin in excellent condition, without any irritation developing.

The Carrel tubes were changed as frequently as necessary and their position within the chest was ascertained by X-ray examination. The quantity of fluid necessary to flood the cavity was measured from time to time and an amount of hypochlorite solution just short of this instilled every two hours, day and night, the procedure being to flood and not to irrigate the cavity. Smears from within the cavity and from the surface of the incision were taken three times a week, the number of organisms per microscopic field counted and charted for bacterial control.

The secondary closure operation was done under either novocaine or nitrous oxide and oxygen anesthesia. The time selected was when the bacterial count showed that smears from within the cavity had reached a constant level of one organism in from 5 to 10 microscopic fields. It consisted in dissecting out the scar tissue and the tract of the sinus down to the pleura, filling in the dead spaces in the chest wall with a flap of muscle, and suturing the skin with interrupted linen. In some instances a single Carrel tube was left under the skin for a few days.

Of the series, five cases have been closed by operation: two empyema and two bronchial fistulæ closed spontaneously. Another patient with bronchial fistula has been brought from a bedridden septic condition, in which he was fast losing ground, to a fairly healthful man. (See note.) Four cases died; one obviously of the combination of pneumonia and empyema; the second from pericarditis with effusion and a walled-off mediastinal abscess; another from an abscess of the brain, which shows the widespread sepsis of these two cases; and the fourth from a gumma of the left parietal lobe of the cerebrum.

Distinct bronchial fistula developed in three cases, and from the symptoms it was suspected in a fourth. This condition was first

evidenced by the patient complaining of smelling and tasting the hypochlorite when fresh solution was instilled, and of paroxysms of irritative coughing at these times or upon certain changes in position. The diagnosis in these three was confirmed by injecting methylene blue into the pleural cavity and seeing the dye appear in the sputum. They later developed distinct fistulous tracts, with the usual symptoms. Another patient complained bitterly of tasting chlorine and had the characteristic cough, but we could not at any time recover any of the dye in his sputum, nor did he develop a fistulous tract.

In our opinion there may be three causes for these fistulæ: The original condition may be a pyopneumothorax, as in the case of W. B. W. An internal pneumothorax may be produced by tearing the lung tissue at the time of operation in breaking up the adhesions. Lastly, the combined presence of the tubes and the solvent action of the hypochlorite solution may cause a breaking down of the diseased visceral pleura and an opening into the lung tissue. These occurred among the sickest that recovered, and the low vitality of these patients was undoubtedly a contributory factor.

CASE 1. W. B. W. C. M. M., U. S. Navy. 25 years of age. This case is of particular interest for its sequence of events, the marked emaciation, exceedingly low vitality, profound sepsis, and the spontaneous recovery from a bronchial fistula. The patient was admitted February 17, 1919, with a diagnosis of influenza; temperature, 102; pulse, 100; respiration, 22; and the usual symptoms of the 1919 epidemic. On February 22 he was resting comfortably; temperature, 98; pulse, 78; and respiration, 20. On March 1 he complained of pain in the left thigh, and upon examination and operation a deep cellular infection, with a large amount of pus, was found. W. B. C. 10850; poly., 77 per cent; s. lymph., 13 per cent; l. lymph., 8 per cent; trans., 1 per cent; eosin., 1 per cent. Bacterial examination of pus showed pneumococci (Type I) and streptococci.

The diagnosis was changed to cellulitis. For the next four and one-half months his leg was continuously draining from deep cellular infections which formed from the gluteal region to the ankle, and his general physical condition was progressively becoming worse. During this period Dakin's solution was used spasmodically, but without any well-developed technique. An X-ray on July 21 showed absorption of the bones of foot and ankle, periosteal thickening about the knee, and periosteal absorption in the lower half of the left femur. At about this time pus was found in the right chest. On July 24, 1919, under nitrous oxide and oxygen anesthesia, the left thigh was amputated at the junction of the upper with the middle third. The

ninth rib was resected, and about 500 c. c. of thick yellow pus were evacuated from the right chest. He made a very poor post-operative recovery but improved slowly after a few days. The stump healed slowly, but the empyema continued to drain a varying quantity of pus.

On September 21, two months after the empyema was discovered, systematic Carrel-Dakin treatment was started. At this time his vitality was extremely low; he was markedly emaciated, of a septic yellow color, running an irregular fever, and very whiney with an infantile cry. Blood examination showed: Hb., 60 per cent; R. B. C., 3,320,000; W. B. C., 9,500; polys., 63 per cent; s. lymph., 33 per cent; l. lymph., 2 per cent; trans., 2 per cent. Bacterial count from within the cavity and the surrounding skin showed an infinity of organisms. Urine showed a trace of albumen and a few hyaline and granular casts. X-ray showed thickened right pleura with fluid and pneumothorax, upper. He was operated upon under nitrous oxide and oxygen anesthesia, the old scar and sinus were dissected out, the opening made larger by further rib resection, and the cavity packed. October 1 packing removed and routine dressing started; October 10 general condition slightly improved, drainage much diminished; bacterial count, 30 per field from within chest and 20 per field on the surface; complains of tasting chlorine and has an irritant cough when hypochlorite solution is instilled.

October 25 general condition much improved; much less septic; less irritable and less apprehensive; appreciable gain in weight; empyema cavity much smaller; bacterial count, 7 per field; bronchial fistula demonstrated with methylene blue. November 3 X-ray shows practically no fluid; Carrel tubes in good position; infiltration of right and left lungs; heart displaced upward; high diaphragm. November 20 practically no discharge; repeated sputum examinations negative for tubercle bacilli. November 23 X-ray showed heart displaced to right, considerable improvement over last plate; lungs and pleura practically cleared up. December 5, ten weeks after the systematic treatment had been begun, the sides had spontaneously closed and he was up and about the ward, having gained a known 20 pounds in weight. Physical signs showed impaired resonance over right base, but with breath sounds to the ninth interspaces and a downward expansion of one-half inch on deep inspiration.

This patient was eventually given an artificial limb, surveyed for his amputation stump, and is now attending college by the aid of the Vocational Training Board. He was most certainly still on the downward grade when this treatment was started, and has made a most remarkable recovery. He is shown as the right-hand case in figures 3 and 4.

CASE 2. B. A. R. S. C., first class, U. S. Navy, 30 years. Admitted September 17, 1919, with a diagnosis of pleurisy, sero-fibrinous; a history of having been aspirated three times since September 2 and clear fluid removed. Examination showed poor nutrition; severe cough; diminished expansion right side; dullness and absent breath sounds at right base; heart displaced upward and to the left; apex in fourth interspace; otherwise negative. Aspiration gave clear fluid. September 29, aspirated pus contained colon bacilli. The diagnosis was changed and he was transferred to our ward. October 1, examination showed moderate emaciation, moderate sepsis, symptoms of respiratory embarrassment and irregular fever. Hb., 72 per cent; R. B. C., 3,690,000; W. B. C., 14,200; polys., 78 per cent; s. lymph., 14 per cent; l. lymph., 8 per cent; trans., 2 per cent. Urine showed a trace of albumin; otherwise negative. X ray showed thickened pleura with fluid; heart displaced to left. Operation under local anesthesia exposed a large cavity extending up behind the scapula and a smaller one extending to the pericardium; these two occupied about one-third of the right chest. The pleura was thick and covered with a shaggy exudate. Several large clots of fibrin were removed. About 450 c. c. of pus were evacuated and the cavity was packed.

October 2, packing removed and routine treatment started. Bacterial count shows an infinity of organisms. October 10; for the first week this patient continued to run a high septic fever and to lose ground. Pericarditis with effusion by extension from the pleura was suspected, but not confirmed. Repeated sputum examinations were negative for tubercle bacilli. October 16; general condition slightly improved, though still septic and running an irregular fever. Bacterial count, 45 per field. October 25; general condition much improved. Cavity about one-half former size; drainage scanty; bacterial count, 20 per field. At about this time patient began to complain of tasting chlorine and to cough on instillation of fluid, but bronchial fistula could not be demonstrated.

November 7, X-ray showed area of consolidation in the central portion of the right lung; thickened pleura improved; no fluid; tubes in good position. November 19, 50 days after beginning Carrel-Dakin treatment, he was operated upon under local novocaine anesthesia and the chest wall closed. A slight superficial infection of the chest wall developed, was chlorazened, and closed spontaneously in about a week without extending to the pleural cavity.

November 26, X-ray showed condition much improved; thickened pleura and infiltrated area clearing up. This man is known to have gained 27 pounds in weight, and after having his tonsils removed was restored to duty. He is the case to the left in figures 3 and 4.

CASE 3. A. A. El., three, U. S. Navy, 24 years. Developed empyema August 7, 1919, but was not placed under systematic Carrel-Dakin treatment until September 30, eight weeks later. His chest was closed on November 9, or in six weeks, but the chest wall and to a slight extent the pleural cavity became reinfected, and he was not completely closed until December 8, or 10 weeks after beginning treatment. He is the central man in figures 3 and 4.

CASE 4. A. W. R. C. M. M., U. S. Navy, 24 years. Had influenza January 19, 1919, and pneumonia January 23, with empyema January 30, and was discharged to duty June 29. On July 8, 1919, was readmitted to this hospital with a recurrence of empyema, which drained for 10 weeks. Systematic treatment was begun September 28, and three attempts at closure were unsuccessful, so it was not until April 26, 1920, that his side was healed—seven months later. He is known to have been in excellent general health for the past two months and to have gained 26 pounds in weight.

CASE 5. W. A. E. Captain, M. C. (ret.), 25 years. Admitted January 1, 1920, with pneumonia. Aspirated and pus found on January 13, and had rib resection on January 23, with chlorazensation started two days later. March 13, or 11 weeks later, chest was closed and a muscle flap brought down to fill up the space in the chest wall. On March 28 chest was reopened and about 100 c. c. of pus evacuated from the pleural cavity. Chlorazensation was reestablished, and on April 28, or 18 weeks from the beginning of treatment, the chest wall was again closed. He has had no further treatment at the time of writing, one month after the final closure. The chart (fig. 2) shows the decline in the bacterial count up to the first attempt at closure. The abrupt rise and fall on February 17 is due to the breaking down of some necrotic tissue and infection by the liberation of bacteria.

CASE 6. R. C. C. Ensign (T), U. S. Navy, 25 years. Admitted January 10, 1920, with a diagnosis of pneumonia, and developed a pleuro-pericardial friction on January 16, with empyema January 26; had his resection on January 27, and chest was closed April 15, 11 weeks later. He has had no trouble in the past month. Figures 5, 6, and 7 show the X-ray findings of his chest before operation, during treatment, and after closure.

CASE 7. W. Z. L. F., third class, U. S. Navy. 20 years. Admitted April 14, 1920, with a diagnosis of appendicitis, acute; was immediately operated upon, and developed a post-operative pneumonia, with friction rub. April 22, aspirated and 350 c. c. of bile-tinged fluid removed. The bacterial examination of this fluid showed streptococci

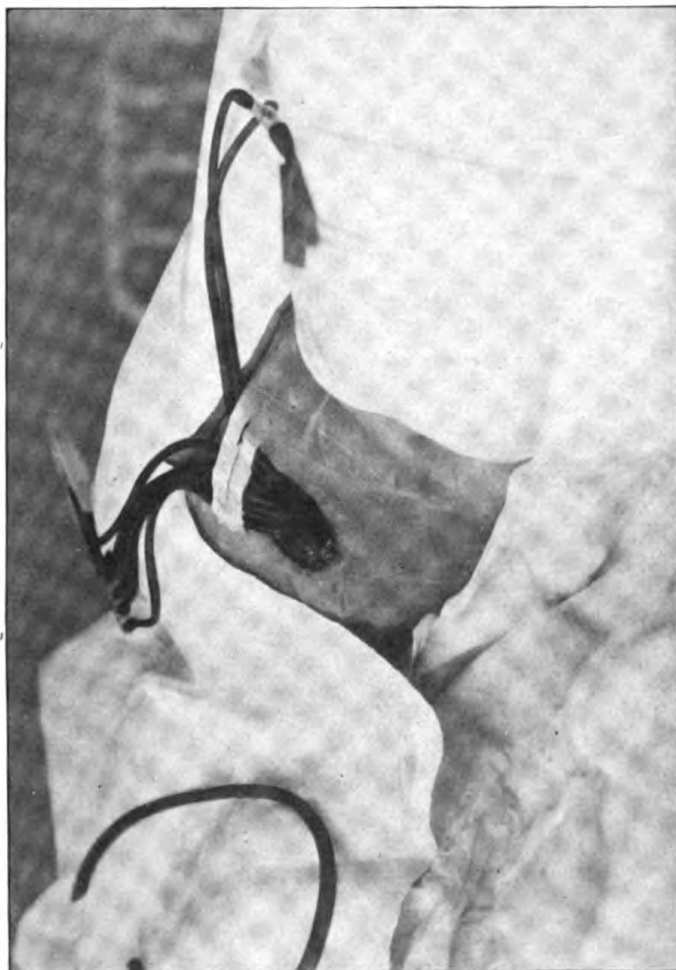


Fig. 1.—Free opening into pleural cavity. Carrel tubes held in position by adhesive strips. Large area of sterile dressing field. Skin protected by vaseline gauze. Ready for outer dressing.

532-1

U. S. NAVAL HOSPITAL

CASE Y. W.A.E.

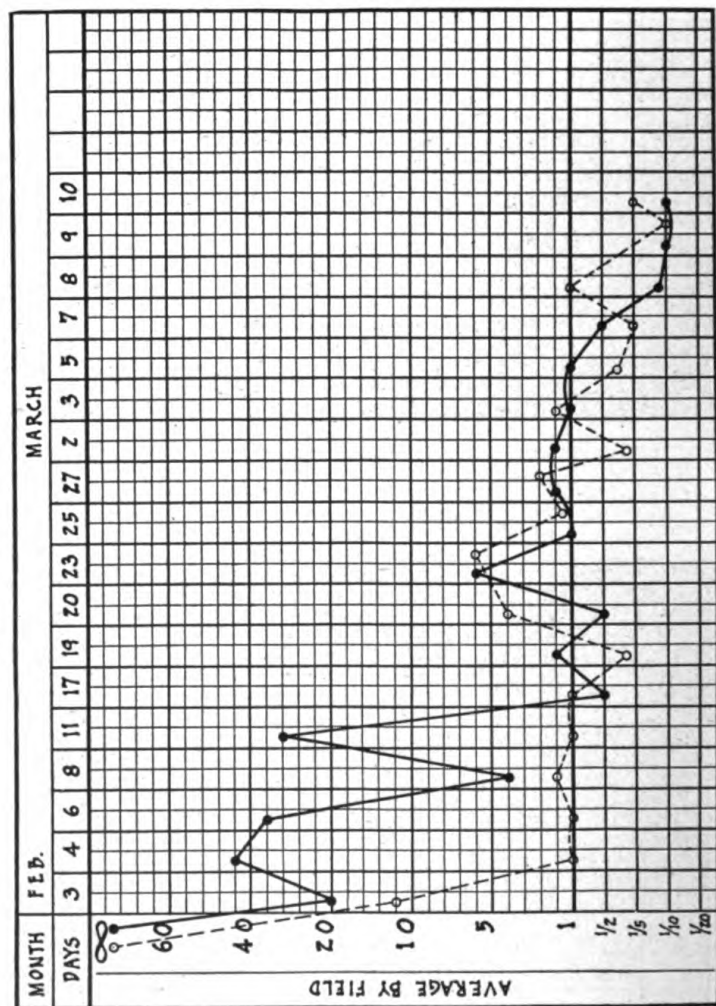


Fig. 2.—Case: W. A. E. Chart showing fluctuations in bacterial count.

532-2



Fig. 3.—Cases, 1, 2, and 3 at the end of treatment. Well-nourished, healthy men.

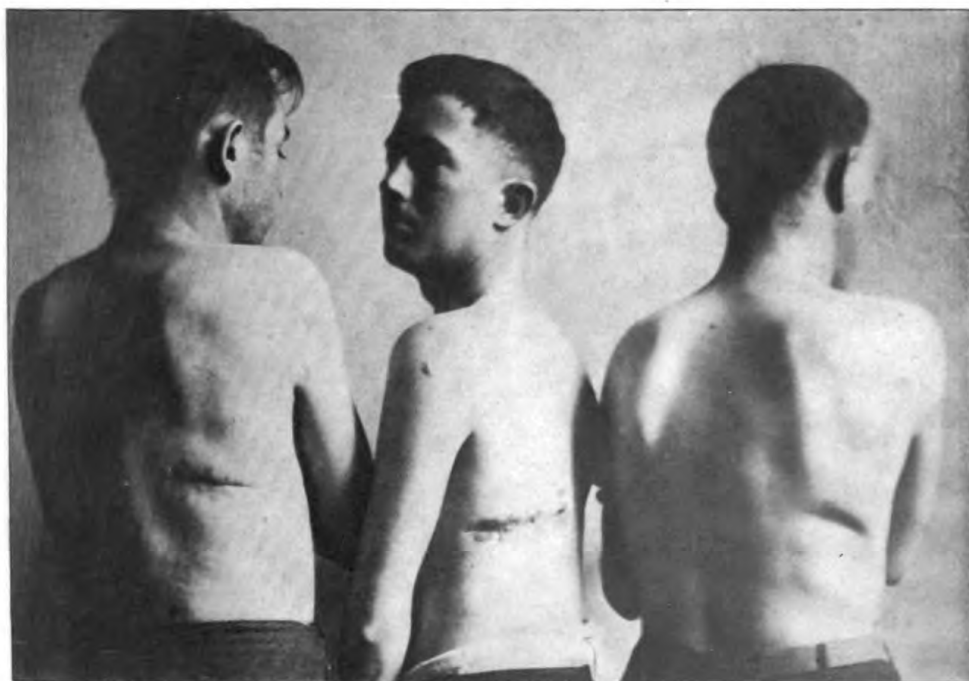


Fig. 4.—Cases: 1, 2, 3. Scars are small. Chests are not deformed. The right-hand figure had a bronchial fistula which closed spontaneously.

532-3



Fig. 5.—Case: 6, R. C. C. Massive effusion.

532-4

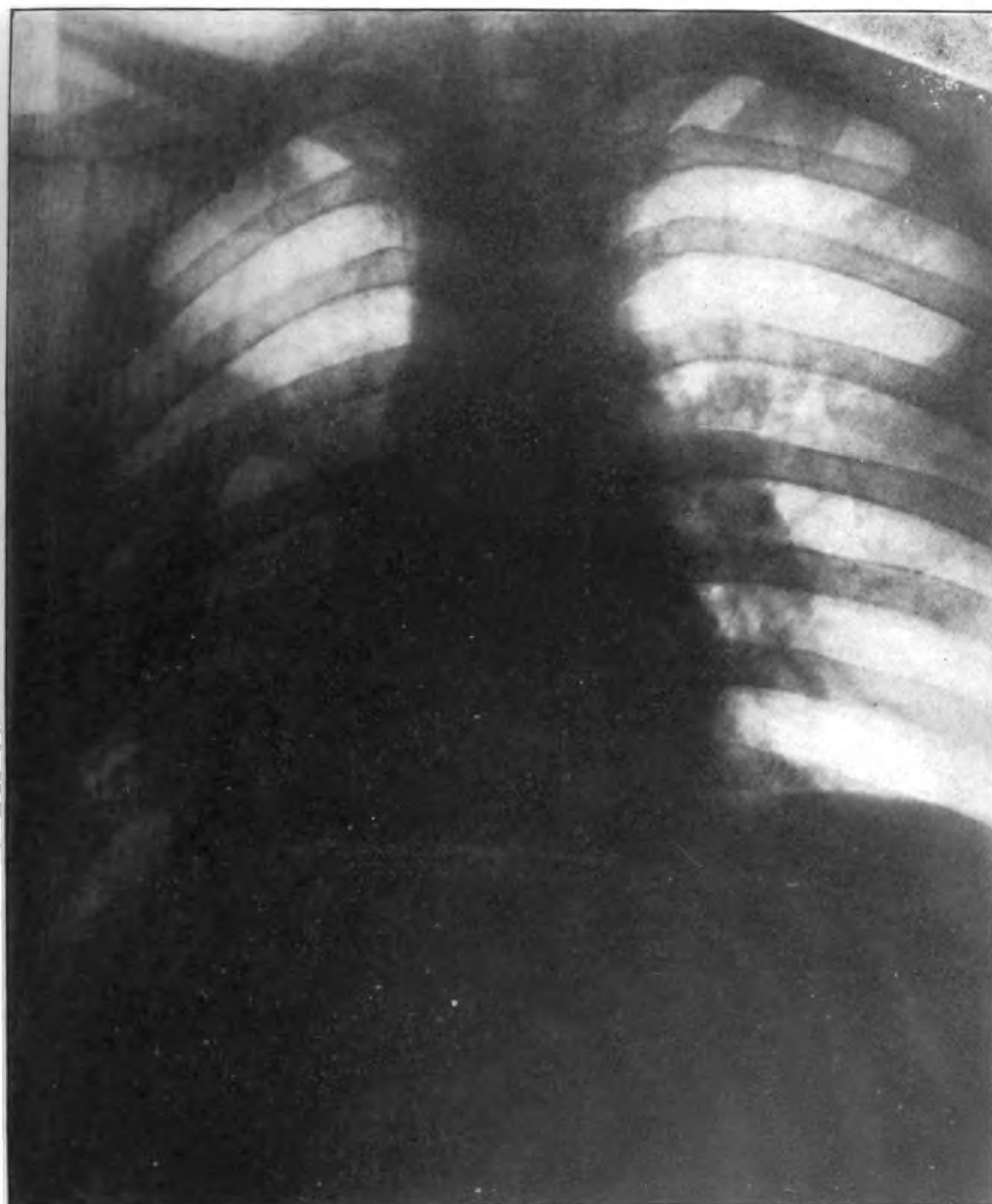


Fig. 6.—Case: 6, R. C. C. Taken with patient on his back. Shows absence of fluid three weeks later. Pleura clearing. Tubes in position.

532-5

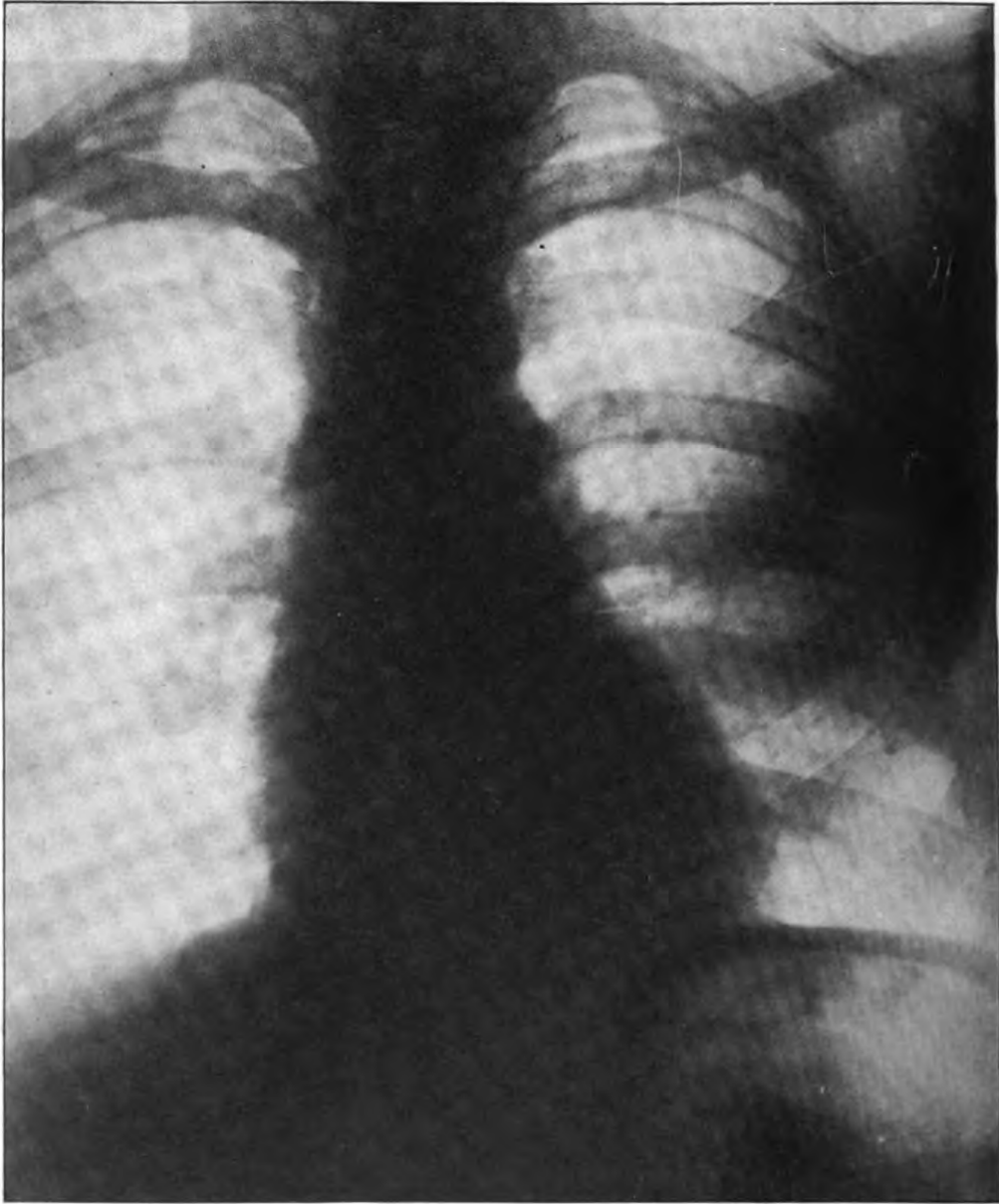


Fig. 7.—Case: 6, R. C. C. Lungs and pleura fourteen weeks after beginning of empyema. Chest closed.

532-6

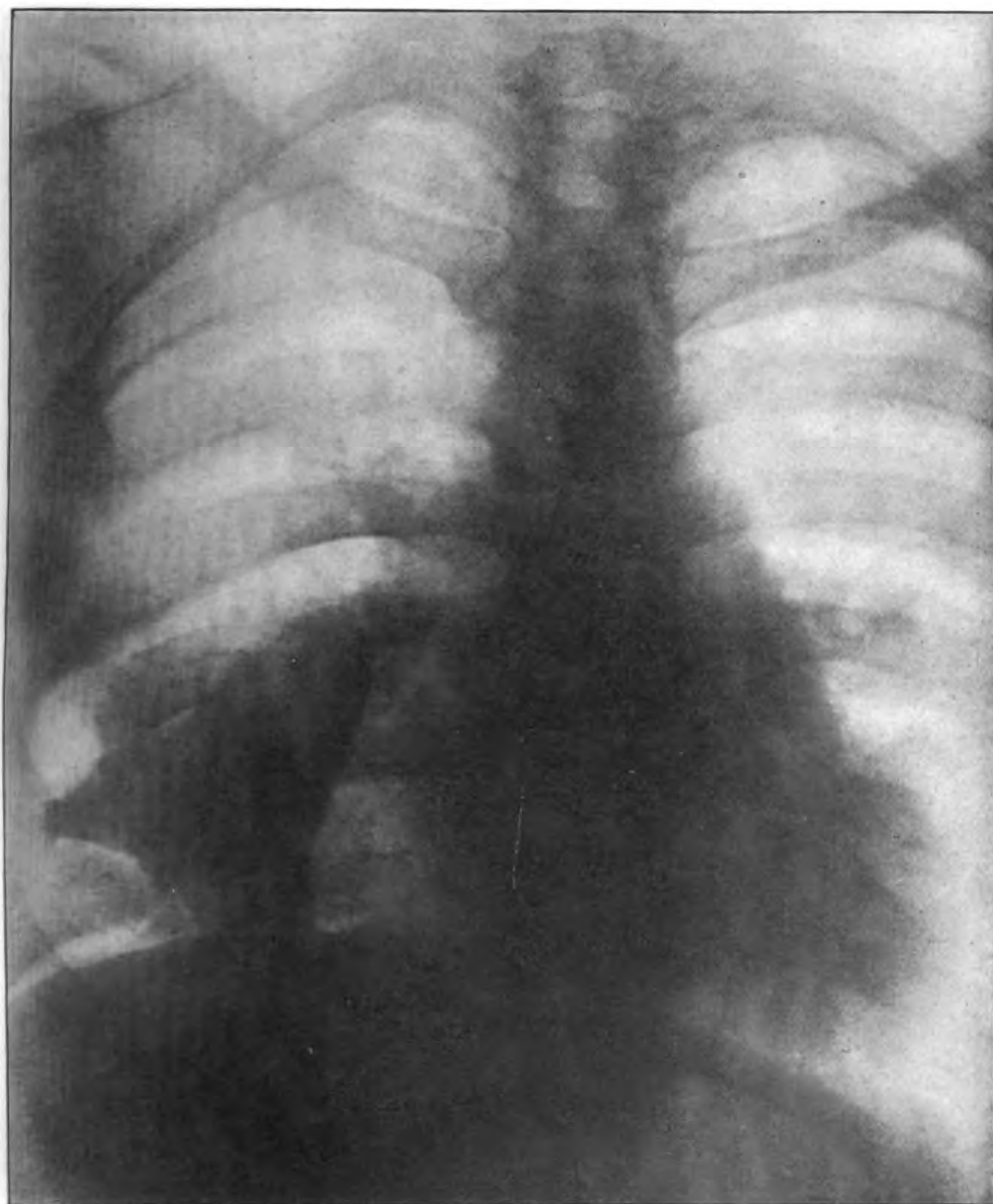


Fig. 8.—Case 8, W. B. M. Condition of lung and pleura after two years of sinus and bronchial fistula. Comparatively little damage. Cavity injected with bismuth.

532-7

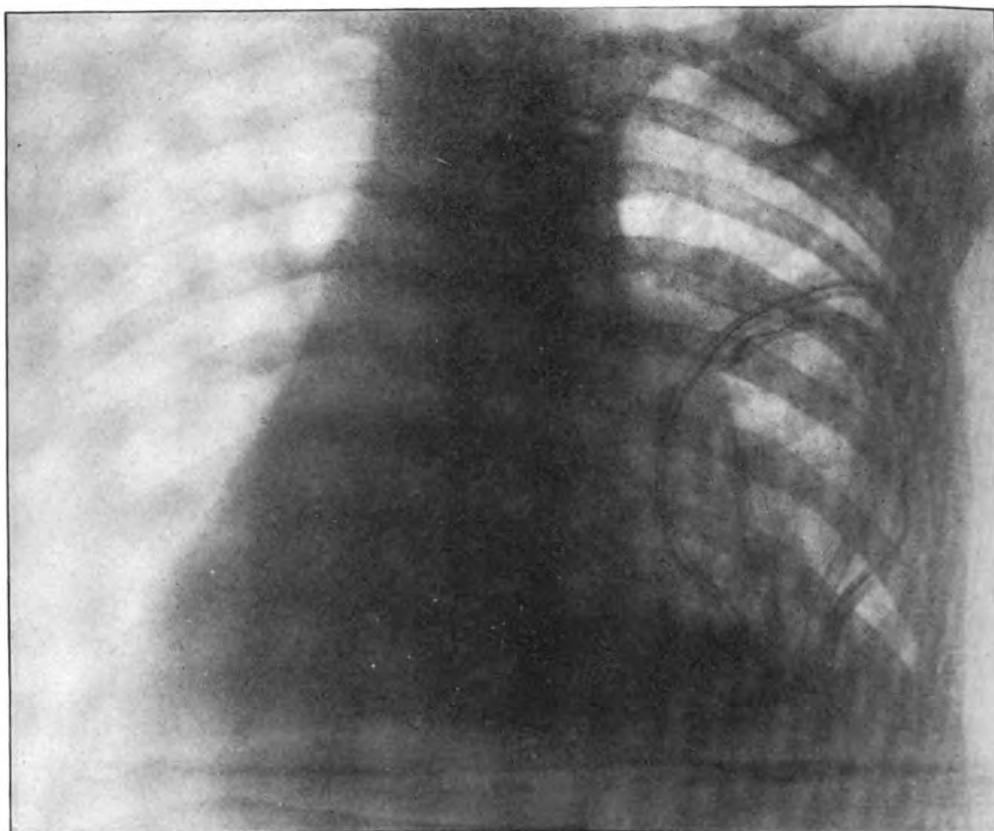


Fig. 9.—One of the cases still under treatment. The position of the soft tubes is fully as good as if they had stylets.
Note the size of the cavity and beginning resolution of the lung.



Fig. 10.—Appearance of the patient, whose lung is shown in figure 9, after four weeks of treatment. Evident well-being and satisfactory nutrition.

and staphylococci. April 27, aspirated and 300 c. c. of pus removed. An immediate incision was made and Carrel tubes were inserted without resecting the rib. May 15, three weeks later, no drainage required and chest closing spontaneously.

CASE 8. W. B. M. S., second class, U. S. Navy. 24 years. (See note.) Developed empyema May 4, 1918, following diphtheria. He had drained constantly for one year and four months and was in most miserable shape when systematic chlorazensation was started, on September 12, 1919. All attempts to close his side have failed, and he has at present a bronchial fistula, with slight drainage, which would probably require extirpation of a lobe of the lung and obliteration of the pleural cavity to cure. He is in fair health; is known to have gained 13 pounds in weight; can do light duty about the ward; and is at present away from the hospital on leave. Figure 8 shows his pleural cavity injected with bismuth and the present condition of his lung.

CASE 9. R. C. M. Att., third class, U. S. Navy. 20 years. Developed empyema May 18, 1919, and hemiplegia of the left side, which was at first thought to be septic in origin. The Wassermann tests were constantly negative; he showed marked toxicity from 0.4 gm. of salvarsan, and became much worse after its administration. Systematic chlorazensation was started five months after the empyema began, but his chest condition was unimproved when he died of gumma of the brain January 12, 1920.

CASE 10. C. L. D. Sm. M., second class, U. S. Navy. 23 years. He had the treatment started as soon as the empyema, which followed influenzal pneumonia, developed, but the infection spread, and he died six weeks after his resection. The autopsy findings showed, in addition to empyema, a splenic infarct, mediastinal abscess, and pericarditis with effusion.

CASE 11. J. D. M. Lieut. (j. g.), U. S. Navy. 41 years. Post-influenzal pneumonia with empyema. Died five weeks after treatment was begun. Autopsy findings showed an abscess of the brain and a small cavity in the chest, walled off by strong adhesions.

CASE 12. J. M. Baker, second class, U. S. Navy. 22 years. Admitted February 8, 1920, with diagnosis of influenza. Developed pneumonia on February 11 and empyema on February 19. His treatment was started immediately, but he died February 26 as a result of his combined intrathoracic conditions.

CASE 13. W. R. Com., U. S. Navy. 34 years. Admitted January 28, 1920, with influenza; developed pneumonia January 31 and em-

pyema March 5. His treatment was begun March 8, and his bronchial fistula has just recently closed spontaneously, effecting a cure in 10 weeks.

Of the remaining five cases all are out of bed except one, and all have advanced sufficiently far in their recovery to warrant the statement that they will be closed by operation in the near future.

This series is obviously too small a number from which to estimate percentages or to make very definite statements as to results. Though we have not gotten the brilliant results nor effected the rapid closures that the original work of Carrel would lead us to expect, we are assured that the procedure has definite advantages and that our results are well worth careful consideration.

In the cases of average severity we have effected a permanent closure and complete cure in 10 weeks. The amount of scar tissue in the chest wall and pleura has been minimized, and the usual deformity with limited expansion of the affected chest prevented.

Probably the most striking effect has been in the rapid improvement of the patients' general well-being. By the end of the first or second week they had lost their septic appearance, their color had begun to improve, the leaky skin had disappeared, appetite had returned, and the temperature was less irregular. By the end of the third week an appreciable gain in weight was observed, and this amounted to a gain of from 20 to 30 pounds by the time the chest was closed.

The character and amount of drainage changed almost immediately, and within a few days, instead of the usual copious foul-smelling purulent discharge, it was reduced to a thin mucoid exudate, with very little odor other than that of chlorine.

X-ray observations convinced us that the amount of damage to the lung and pleura was diminished, and that when the patient was ready for discharge his affected lung was remarkably clear.

From the standpoint of technique it is thought that the soft tubes are more agreeable to the patient and can be placed in as good position as the stiffened tubes. This can be done easily by using long curved uterine dressing forceps and curving the tubes to any desired position within the chest. The tubes should be changed frequently, as the hypochlorite solution forms a mucoid exudate when it comes in contact with the tissues, and this not only accumulates around the tubes but frequently plugs up the holes.

Acknowledgment is made to Lieutenants W. S. Russel and C. C. Hugger, Medical Corps, United States Navy, for their cooperation in making and printing the X-rays.

NOTE.—Since the writing of this article the bronchial fistula in case 8. W. B. M., has closed spontaneously.



Fig. 1.—Massage to free the scar and prepare the parts preliminary to bone grafting.

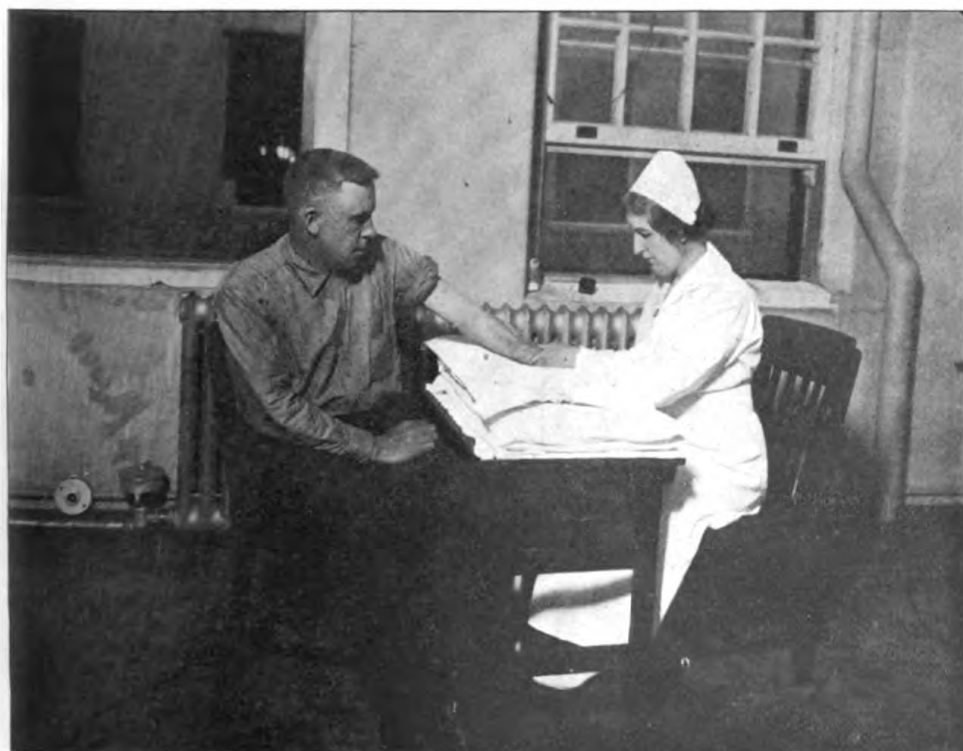


Fig. 2.—Following the use of radiant heat, massage is being employed to free the scar of a compound fracture of radius for which bone graft is indicated.



Fig. 3.—Massage and manipulation of stump to prevent overgrowth of fat preliminary to fitting an artificial limb.



Fig. 4.—While the wound is still in the process of healing manipulation is used to stretch contracted muscles and tendons, increasing the range of motion in a partially ankylosed joint.



Fig. 5.—Stimulating the circulation of the lower extremities after a bone graft by baking.

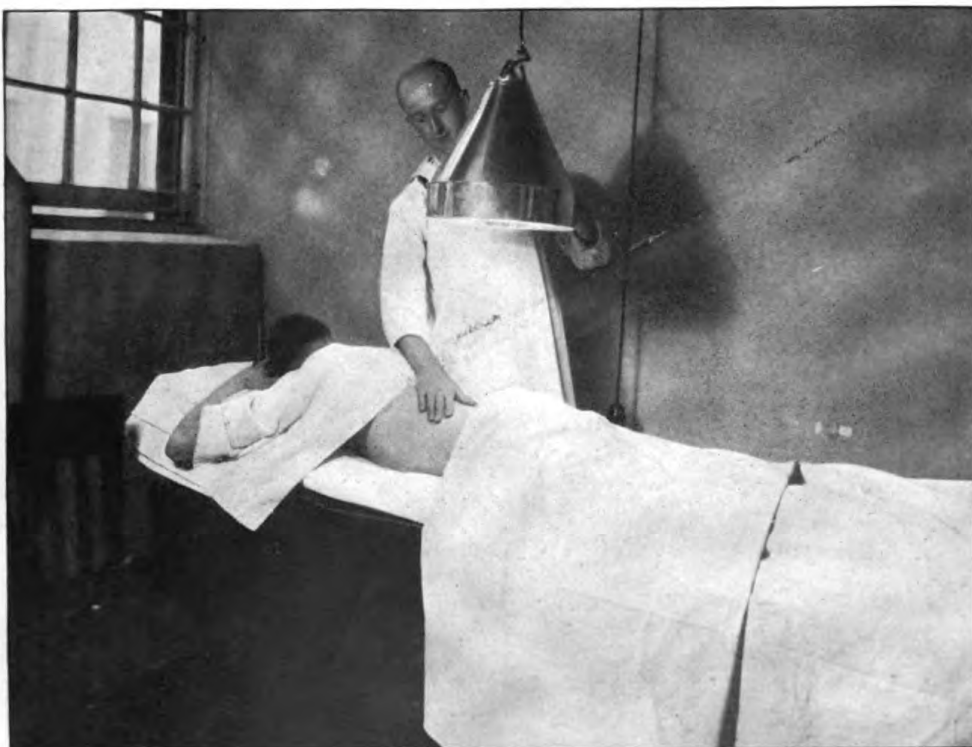


Fig. 6.—Stimulating the circulation in lumbago by radiant heat and light.

534-3

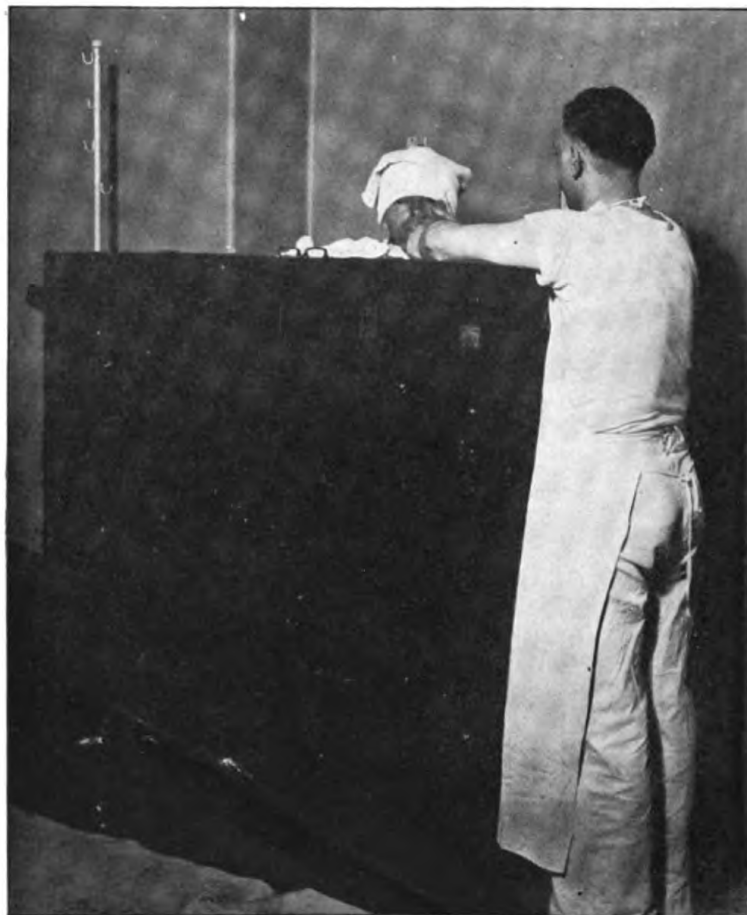


Fig. 7.—Electric-light baths are used to stimulate the emunctories as an adjuvant in treating rheumatic intoxication.

534-4

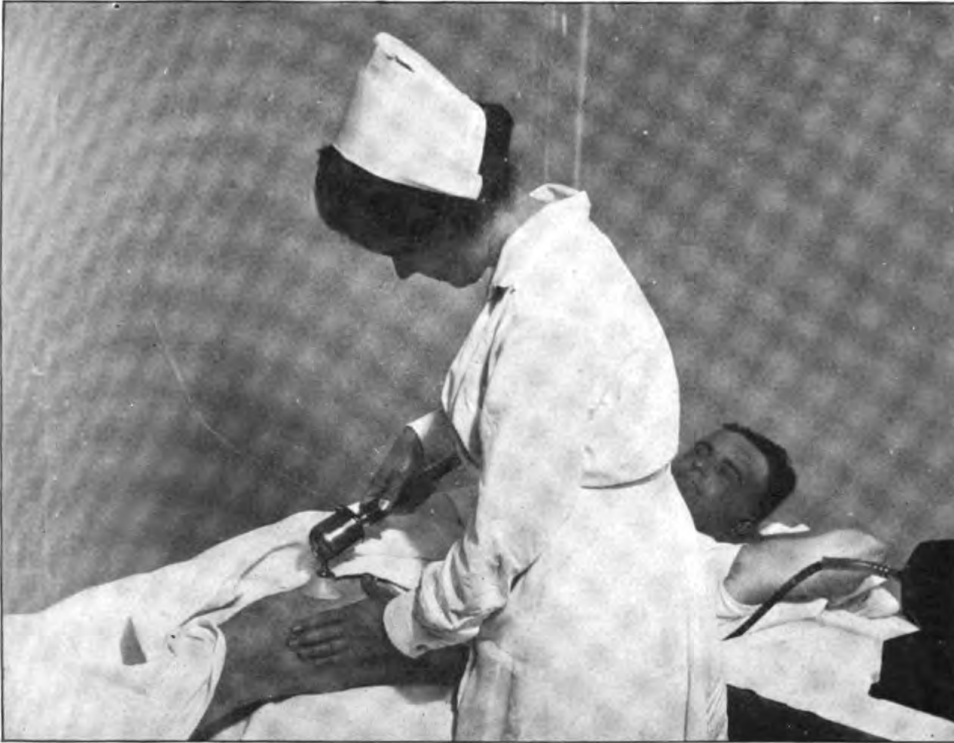


Fig. 8.—Improving the tone of muscles in myositis by the electric vibrator.



Fig. 9.—Painful scars and partial muscular paralysis undergoing treatment in the whirlpool bath which consists of swirling currents of air and water at 110 F.

534-5



Fig. 10.—To exercise the circulation of the lower extremities use is made of the Scottish douche which consists of alternating sprays under 20 pounds pressure of water at 101 F. and 60 F.

534-6



Fig. 11.—A continuous bath at 96 F. to reduce nervous irritability.

534-7



Fig. 12.—The Nauheim bath. The temperature of the water is 100 F. The patient lies on tubes through whose minute perforations CO_2 is forced under pressure.

534-8



Fig. 13.—Increasing the pelvic circulation by Sitz bath.

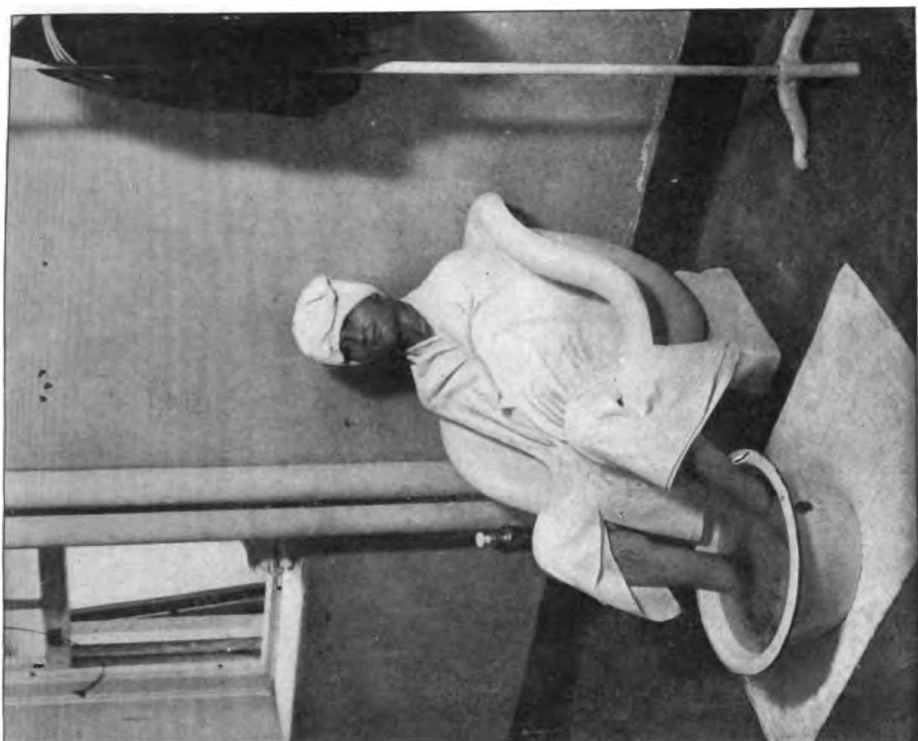


Fig. 14.—Monopolar high frequency current through a vacuum electrode used for its sedative effect.



Fig. 15.—Use of the sinusoidal current for gentle stimulation in the treatment of foot-drop.

534-10



Fig. 16.—Diathermy by bipolar high-frequency current. Conversive heat is formed inside of the wrist. Used as an auxiliary treatment for Colles's fracture.

534-11

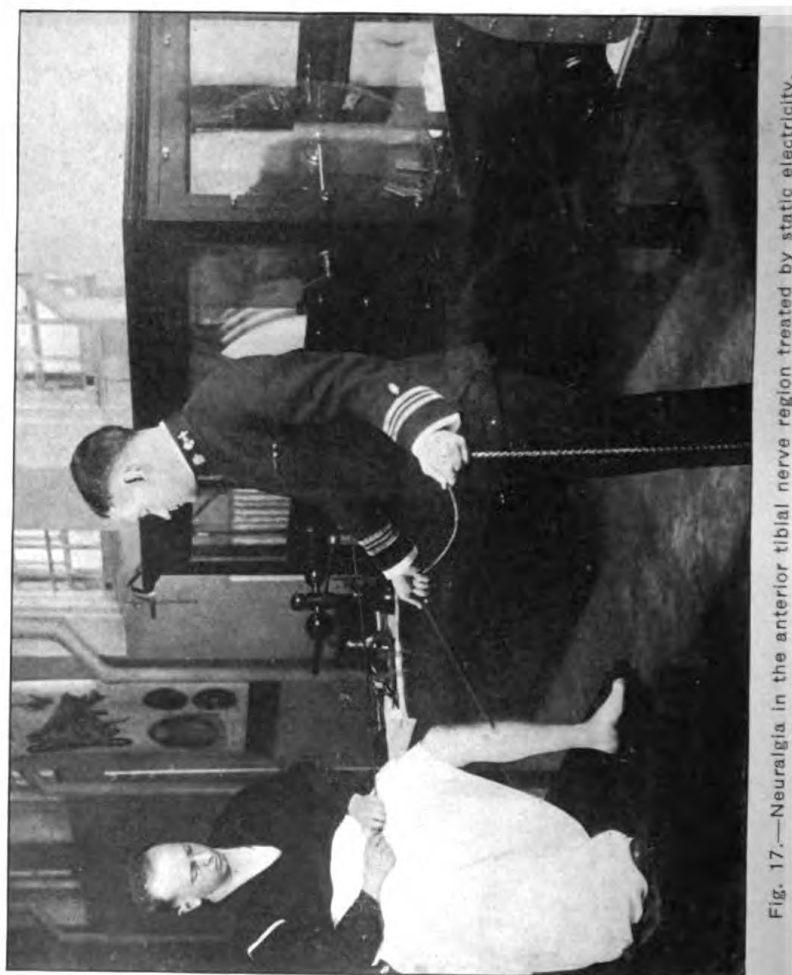


Fig. 17.—Neuralgia in the anterior tibial nerve region treated by static electricity.

534-12



Fig. 18.—The upper-extremity table which supplies various devices for mechanical exercise.

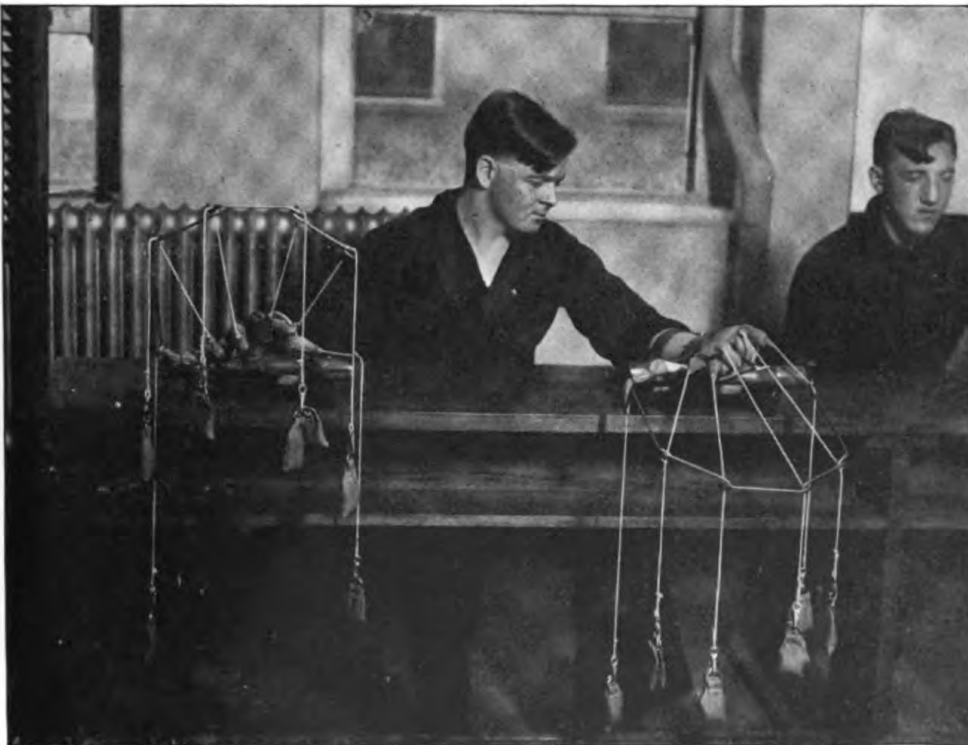


Fig. 19.—Devices for increasing flexion and extension of fingers.

534-13



Fig. 20.—Finger treadmill to exercise the fingers after injury to the median nerve.



Fig. 21.—Finger-stretching apparatus to restore the power of abduction.

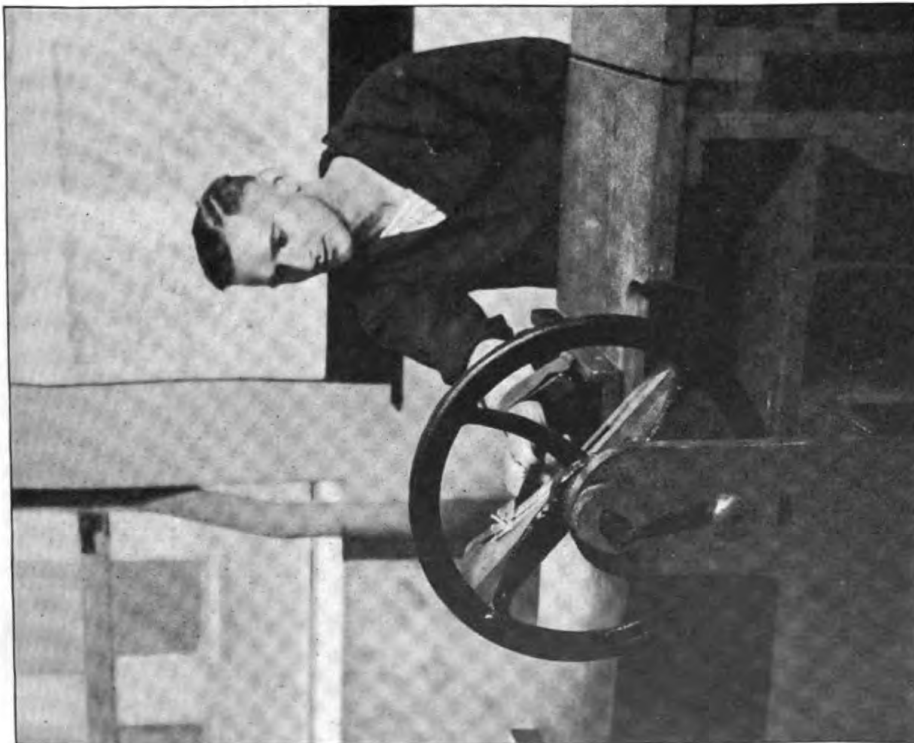


Fig. 22.—For improving circumduction of the wrist. The patient grasps the handle placed off center on a universal joint and an attendant turns the wheel.

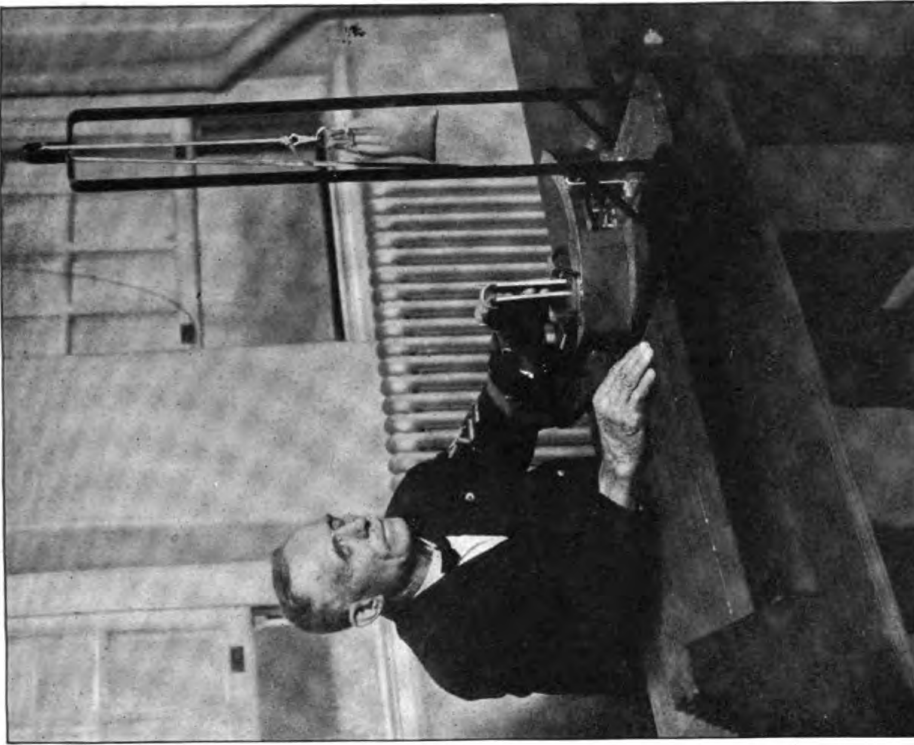


Fig. 23.—Mechanism for improving flexion and extension of the wrist in partial ankylosis.

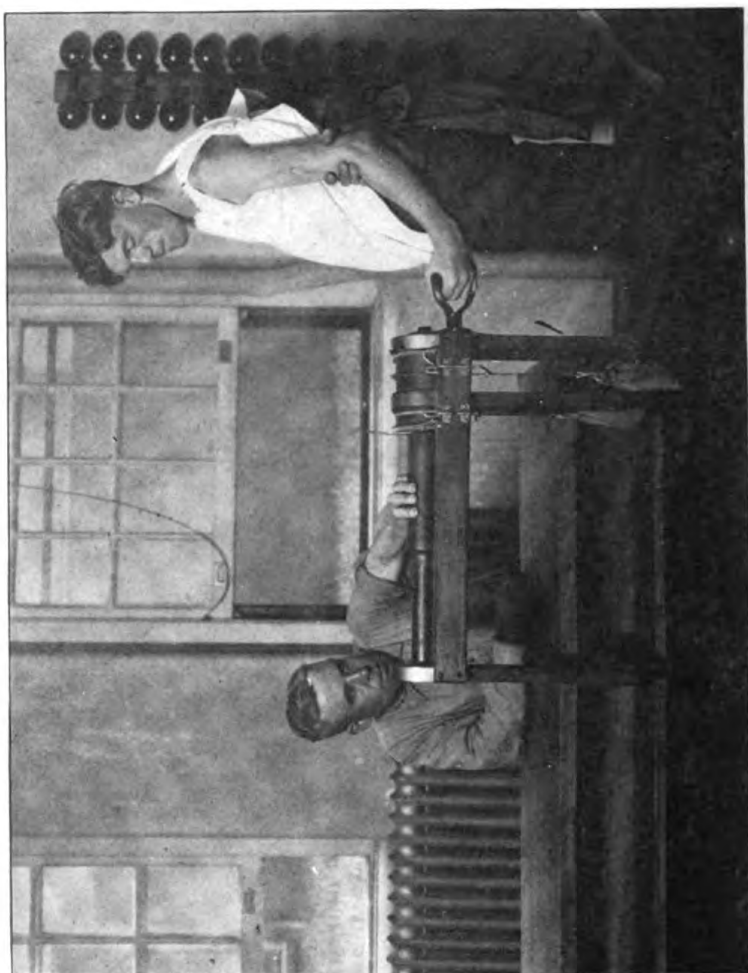


Fig. 24.—The wrist mill. The patient standing is practicing pronation and supination to improve an old Colles's fracture. The seated patient is exercising flexor and extensor muscles.

534-16

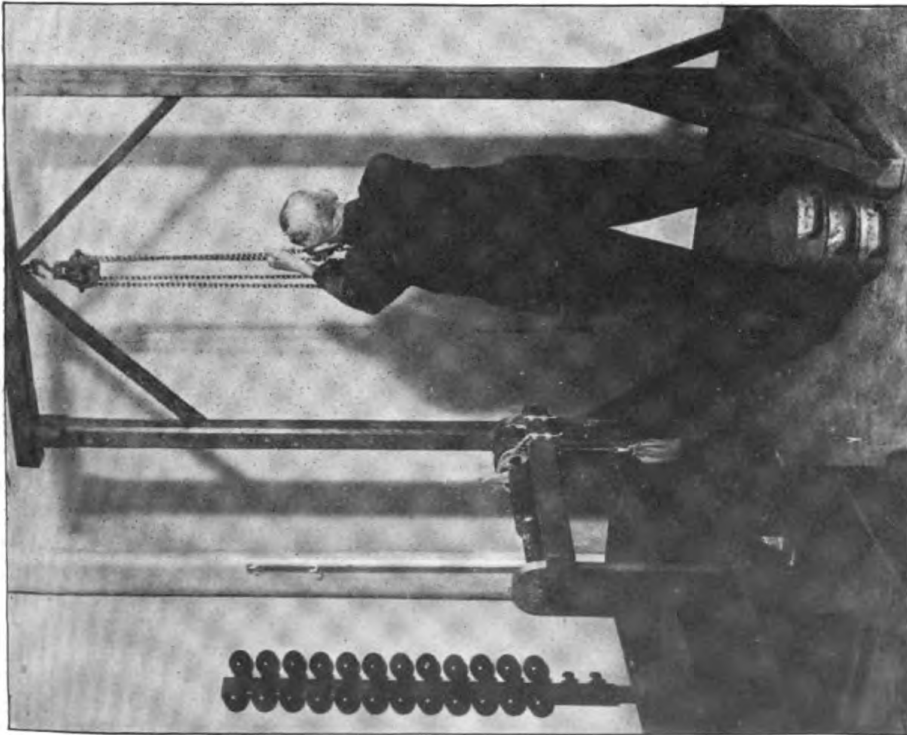


Fig. 25.—Weight lifting to strengthen muscles of back and shoulders.



Fig. 26.—The creeping board provides exercise for the shoulder muscles.

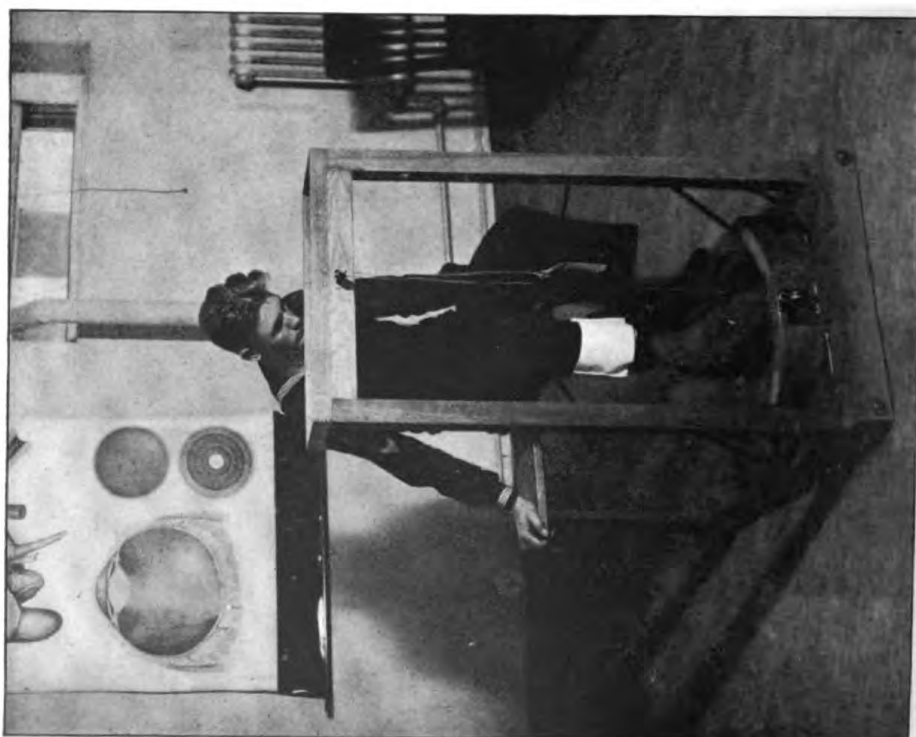


Fig. 27.—A feature of the treatment of Pott's fracture. Device for encouraging adduction and abduction of the foot and rotation of the knee.

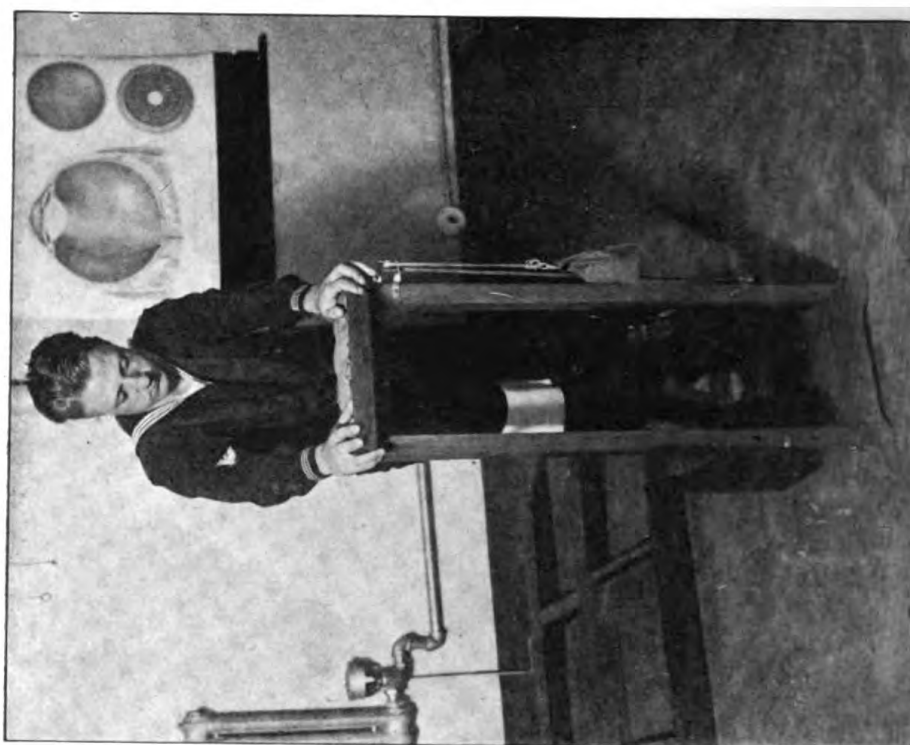


Fig. 28.—A therapeutic measure for foot-drop.



Fig. 29.—Amplifying the power of circumduction is the last step in the treatment of Pott's fracture.



Fig. 30.—Stretching muscular and ligamentous attachments by eversion and inversion of the ankle after treatment with plaster cast.

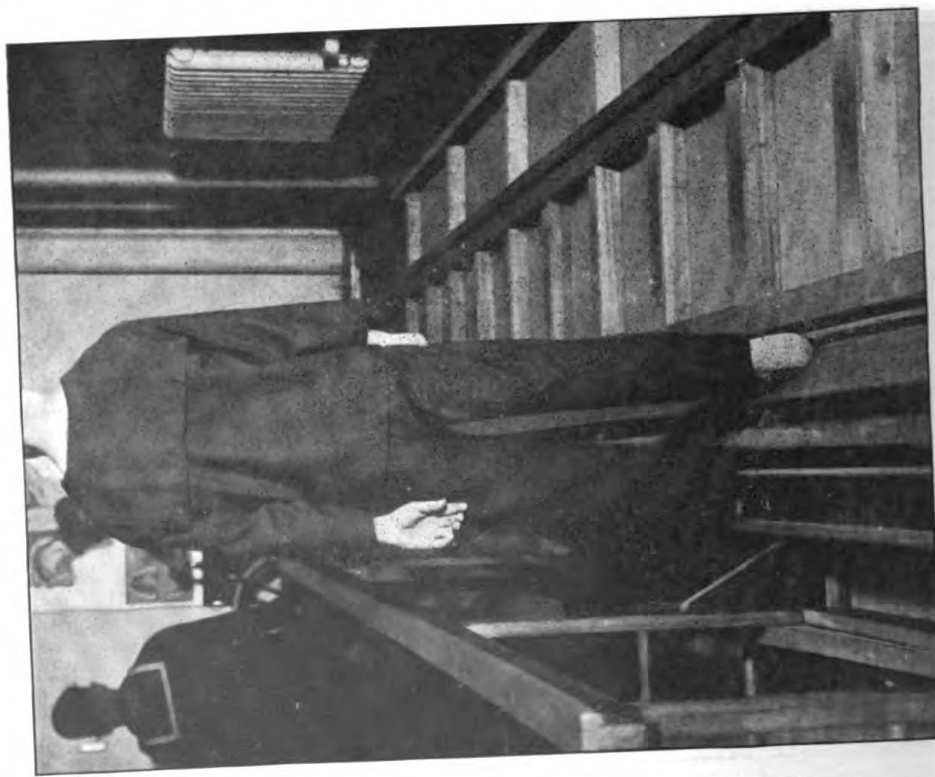


Fig. 31. The eversion ridge. This device is used in connection with the one shown in Fig. 30.



Fig. 32.—The Barron ladder for the treatment of flatfoot by exercise. The steps are at an angle of 35° and at 18-inch intervals. The patient walks with his toes turned in.

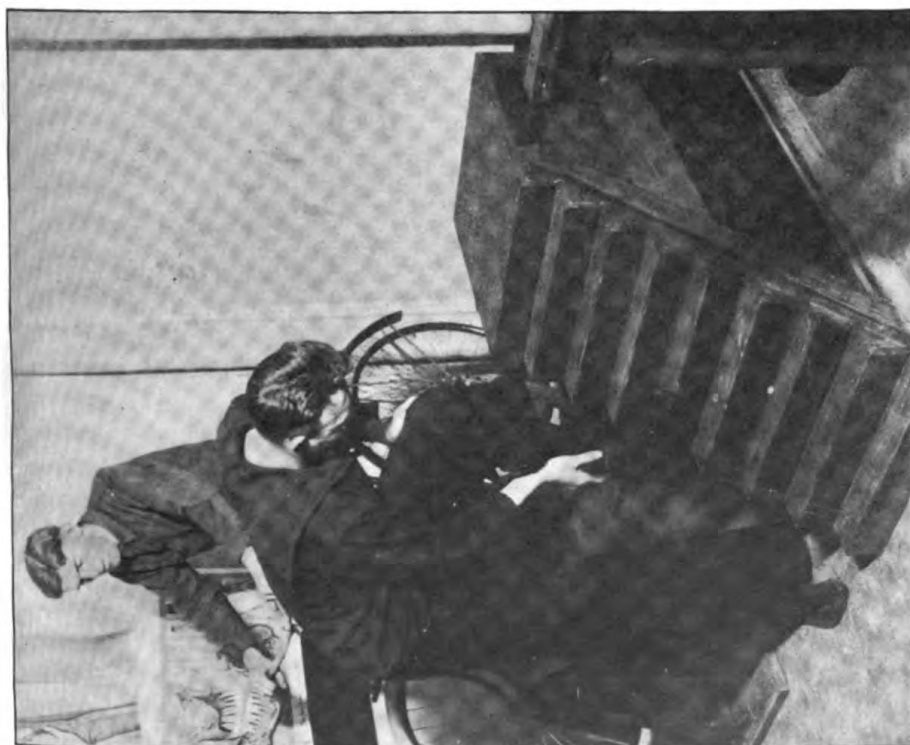


Fig. 33.—Creeping board for knee and thigh flexion. This is especially useful in stretching the Tendo Achillis.



Fig. 34.—Horizontal ladder for thigh and knee flexion. Useful in partial ankylosis of knee and hip and in teaching the use of an artificial limb.



Fig. 35.—The stationary bicycle is for promoting flexion and extension of knee and foot.

535

PHYSICAL THERAPY.

"Evil is permitted that thereby greater good may be secured to the universe." It is lamentable that such a calamity as the World War should be necessary to awaken an enlightened profession to the realization of such a potential adjuvant in the treatment of the diseased and means for the reeducation of the disabled as is afforded by the utilization of physical agents.

The incidental wound of every-day life, reproduced by modern warfare in enormous groups, has given us an opportunity to study the efficacy and absolute indication for this branch of therapeutics; and he who, in the light of all facts learned voluntarily, chooses the darkness of ignorance, "is guilty of all the crimes which ignorance produces, as to him that should extinguish the tapers of a lighthouse might justly be imputed the calamities of shipwrecks."

Physical therapy is by no means an evolution of the war, having been employed in this country before the "great catastrophe" by a few individual enthusiasts and those hospitals that have recognized it as a potent adjunct to the other members of the therapeutic family. The excellent equipment of a large number of German hospitals with necessary facilities for the utilization of physio-therapeutic measures long before the outbreak of the war is evidence that it had been recognized and accepted by the majority of their physicians.

During the war thousands of physicians have seen physical therapy, fostered by such men as Director General Goodwin, K. C. B.; Colonel Sir Robert Jones, K. C. B., inspector of military orthopedics; Dr. André Treves; Major R. Tait McKenzie, R. A. M. C.; the professor of physical education in the University of Pennsylvania, and other leaders, obtain a definite and permanent position among the therapeutic group. The war has thus served to emphasize the great value of physical therapy and has proved that without its employment many physical disabilities caused by injuries or disease could not have been treated so successfully.

If, however, these principles are not applied to post-bellum conditions, the lessons thus learned by bitter experience will have been more or less in vain.

It should be remembered that suffering humanity owes no debt of gratitude to the physician unless he has applied every means available for relief or cure.

This much-abused branch of the therapeutic tree includes the application of radiant heat and light, including actinic rays, of electricity, hydrology, massage, passive movement, gymnastic exercises, and functional reduction. One or several in combination may be used for (a) the preparation of scar tissue for or after operation; (b) freeing it from adherent structures; (c) functional neuroses with

accompanying paralysis and atrophy of muscles; (*d*) bringing to light a hidden infection in an old scar; (*e*) post-operative ankylosis; (*f*) debility from pneumonia, typhoid, post-operative conditions, and the like; (*g*) the treatment of sprains, fractures, arthritis, drop foot, flat foot, etc.; the preparation of the stump for an artificial limb to prevent fat formation.

The accompanying illustrations represent some of the methods employed in the physical therapy department at the United States Naval Hospital, New York, N. Y.

OCCUPATIONAL THERAPY FOR SURGICAL CONVALESCENTS.

Occupation takes one of the first places in treatment at this hospital. All patients are urged to take up some sort of work. Some bed patients prefer to cut gauze and make surgical dressings, while other bed patients make applicators, fold sputum boxes, and do other things to increase the efficiency of the hospital.

The Red Cross maintains a large, modern workroom, with a very efficient personnel. Patients who are up and about work under instruction at the Red Cross rooms and make a great variety of trinkets, toys, and ornaments. Some of these articles, such as neatly made beaded chains, bring as much as \$20 when put on sale. Other articles requiring less skill and finesse bring smaller amounts; but every little bit adds to the patient's income.

When patients are confined to wheel chairs they are wheeled to the Red Cross rooms by other patients or hospital corpsmen and then take part in the same kind of work as engaged in by those up and about.

When patients are unable to leave their beds the Red Cross workers bring the work to them. In bed they make many fancy articles out of beads, covers for tables and stands and baskets, and many other things. All patients who are able are given some light detail in the ward, such as shining brass work, putting beds in line, and sweeping the deck. This work takes very little of their time and increases their interest in the ward.

Smoking rooms, with cards and tables, books, victrolas, and pool tables, are furnished for those who care for indoor sports.

Band concerts and movies and vaudeville acts are held two evenings a week, and these are well attended and take up the patients' time.

The object of occupational therapy is manifold. It takes up the patient's time, thus preventing him from brooding over his own illness. He sees patients worse off physically than he working and this inspires him to work. It helps develop muscles underused from

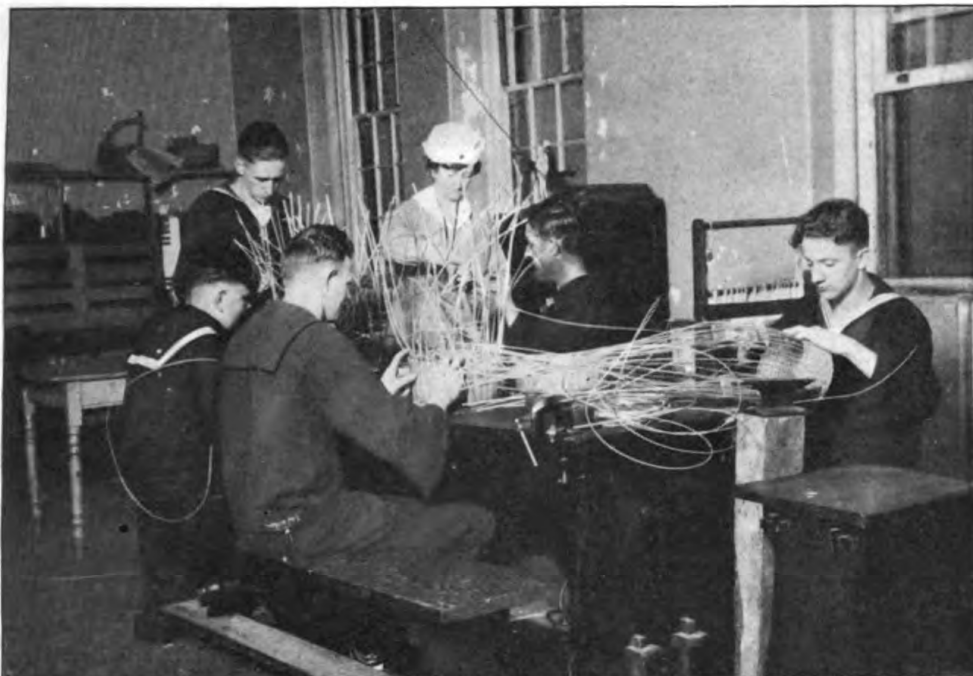


Fig. 1.—A favorite occupation for convalescents is basket weaving. This requires attention to detail and skill and so is absorbing. The sale of the baskets provides pocket money.



Fig. 2.—The Red Cross workroom is well provided with facilities for making toys, a novel form of occupation which gives scope to the imaginative and creative faculties.

536-1



Fig. 3.—General view of the Red Cross workroom. Apparatus and material for many forms of employment are available here. The underlying purpose is to have the patient use his limbs while engaged in some enterprise that interests him.



Fig. 4.—Ambulant patients receive instruction in occupations that entertain. These patients are weaving tablecloths. Convalescents soon become expert at weaving.

536-2



Fig. 5.—Working on dry goods appeals strongly to some patients. Fine movements of the fingers are required.



Fig. 6.—Making necklaces of minute steel beads develops expert fingers. Such objects have a ready sale.

536-3



Fig. 7.—Basketry is peculiarly appropriate for bed patients.



Fig. 8.—Making baskets and bead chains. The monotony of confinement to bed is wonderfully relieved by seeing the work of one's hands grow from day to day and the moral effect is considerable.

536-4

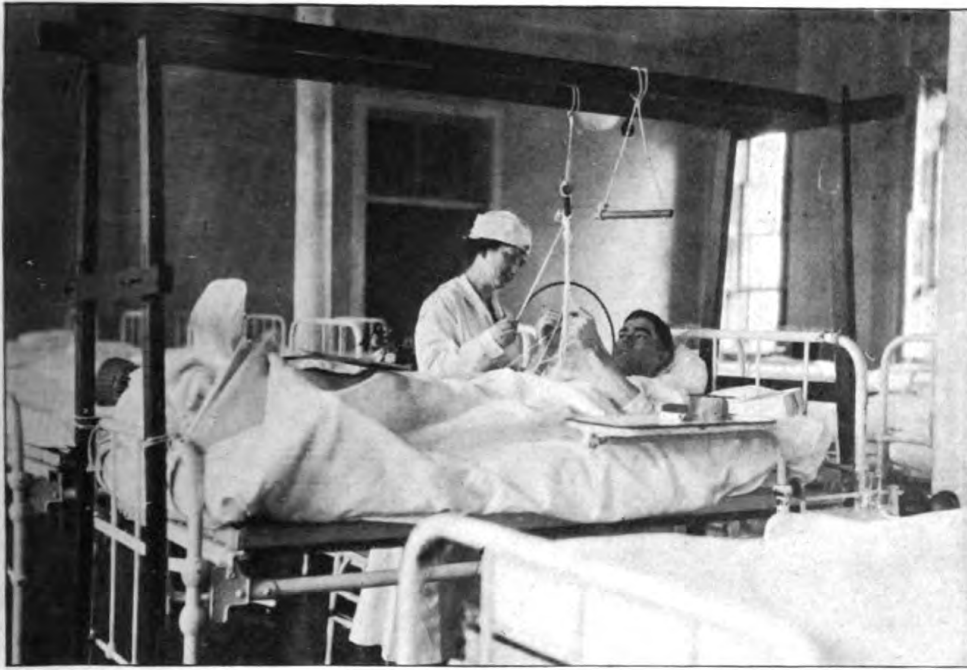


Fig. 9.—Here is a man who has been in bed and flat on his back for eight weeks following an open operation for fractured thigh. He is deeply absorbed in making a cord belt.



Fig. 10.—Busy in the intricacies of making a cord bag, this patient forgets the osteomyelitis which makes him a prisoner in bed.

536-5



Fig. 11.—Teaching a bed patient to make bead necklaces and chains.



Fig. 12.—Recreation room where all sorts of games from cards to pool take the patients' thoughts away from themselves.

536-6



Fig. 13.—In this bright sun parlor the patients are busy at various agreeable tasks instead of becoming the prey of discouragement through idleness. The help and interest of the attendants provides a useful stimulus to accomplishment.

536-7

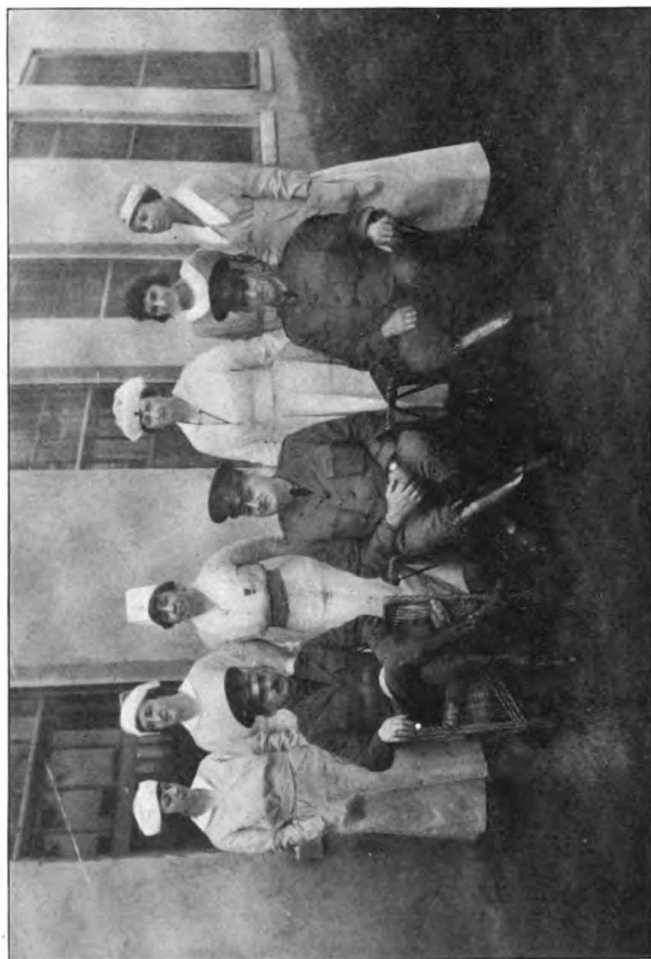


Fig. 14.—A group of Red Cross workers. While helping to instruct the patients and keep them busy they diffuse around them an atmosphere of cheerfulness and hope

sickness and to train new and finer motion of the forearm and hands. The income from the sale of the articles helps his purse. The patient realizes that an added interest is being taken in his condition and derives much benefit physically and mentally.

WAR WOUNDS OF THE JOINTS.

By Dr. L. DELREZ, professor of surgery in the faculty of medicine at Liège.

(Translated from an article in Arch. Med. Belges, May, 1919, p. 513, to illustrate the principles involved in the new treatment of joint injuries.)

I. GENERAL PATHOLOGY.

The two conditions against which the synovial membrane must guard itself are hemarthrosis and infection.

A. *Hemarthrosis*.—Practically every joint injury, whether open or closed, is followed by an extravasation of blood into the synovial sac, and it has been definitely proven that this blood coagulates in the joint, even in those cases where there has been no injury to the bone or cartilage.

Aspiration of the joint soon after the injury yields a noncoagulating fluid consisting of serum and red cells in the proportion of three or two to one, which resembles fluid blood, but is in reality defibrinated blood. Arthrotomy at this time reveals the fact that clots in the form of fibrinous particles, varying in size and color, being too large to pass through the needle, have remained in the joint.

The presence of blood in the joint causes a secondary reaction on the part of the synovial membrane, expressed by the exudation of fluid which dilutes and modifies the blood, so that exploratory aspiration 48 hours or more after the injury yields a fluid quite different from that first obtained, the proportion of red cells decreasing rapidly and the fluid coagulating spontaneously in vitro.

The clots formed in the joint cavity gradually undergo fibrinolysis. If this process is incomplete, the white clot becomes attached to the synovial membrane, organizes, and forms a false membrane. It is probable that these false membranes are responsible for many of the late joint disturbances following a hemarthrosis.

B. *Infection*.—The means of defense and the process of repair are essentially the same whether the injury be in a joint or in the soft tissues. The wound in each case is flooded with an exudate, lymphatic in its nature, and possessing a certain definite ability to combat infectious organisms. These defensive properties are more marked in the case of a synovial exudate, because the conditions in the joint

are more favorable for the preservation of its fluidity. Under certain conditions this exudate preserves its serous character for several weeks, as, for instance, in acute benign metastatic inflammations of the joint, and in staphylococcic infections of the knee, treated by arthrotomy and active mobilization. In many cases of compound fracture of the tibial plateau, or in simple penetrating wounds where primary suture has been impossible, as also in certain cases of arthritis following a joint injury, the wound remains open for several days or weeks without becoming infected. If for any reason the exudate coagulates in the joint, its defensive properties diminish and finally disappear, the wound begins to suppurate, and it then follows the course of any open infected wound.

These facts explain the success of primary suture in joint wounds, and also explain the greater frequency of infections in osteo-articular wounds than in simple penetrating wounds. In the latter case the cleansing of the joint is comparatively simple, and the exudate can take care of the few organisms which survive. In those cases, however, where the bone itself is injured, septic matter is carried into the bony canal and may easily escape the curette, or tiny fragments of bone may become detached and necrotic and form centers of suppuration. In addition, the circumstances are more favorable for the coagulation of the exudate.

The practical conclusions to be drawn from these considerations are, first, that success depends upon the thoroughness with which the joint is cleansed; and, second, that, whenever possible, the bone injury must be isolated from the joint cavity itself.

II. SURGICAL TECHNIQUE.

Operation on a penetrating injury of a joint should be preceded by X-ray examination to determine the location of the foreign body, if present, and the extent of the injury to the bone. X-ray examination, the presence of fluid in the joint, or the drainage of bloody synovial fluid from the wound, usually prove whether the projectile has penetrated into the synovial sac. In cleansing a periarticular wound, doubt may occasionally arise as to whether the projectile has simply grazed one of the culs-de-sac, making a tiny opening, but in cases of this sort an injection of ether quickly decides the question.

Operation has for its object the surgical sterilization of the wound, and the same methods are employed here as in all war wounds—excision of the edges of the aperture of entry, extensive opening up of the wound, trimming of the soft parts down to healthy tissue, excision of the bruised edges of synovial membrane and extraction of the foreign body. The excision of injured tissue should be as complete as possible, and the operation should be concluded by immediate suture.

In cases of bony injury the treatment of the bone itself is the most important and the most delicate part of the operation. A simple penetrating wound with the projectile retained at the end of the canal is treated by emptying out the canal with a curette. This cleansing process is carried 2-3 mm. beyond the end of the canal if the projectile is small, further if the projectile is larger. All of the bruised bone should be removed, and particularly around the spot where the bullet was located. A larger projectile does not make a simple tunnel, but shatters the bone or one of the condyles. The same principles, however, are applicable in these cases also. Every particle of detached bone must be removed and all of the bruised and ecchymotic bone must be cut away, leaving only healthy bone tissue, which can be recognized by its bleeding surface and pinkish color, free from ecchymoses. This requires great care, as even a small piece of unhealthy bone left in the joint may become a focus of infection and imperil the success of the operation.

The next step in the operation is a thorough cleansing of the joint, which is accomplished by means of an abundant irrigation with physiological saline solution at a temperature of about 45 C. Passive motion during the irrigation facilitates the cleansing of all the cula-de-sac and synovial folds. We have abandoned the use of any antiseptic, even ether, as these seem to cause considerable irritation and the production of a persistent and abundant exudation, without any real benefit. Following the irrigation, the field of operation is cleaned up, gloves and instruments changed, and the surgeon searches the wound once more for any bruised tissue or foreign matter which may have escaped the first investigation. The operation is then completed by primary suture, in several layers, without drainage or with extra-articular filiform drainage.

III. POST-OPERATIVE TREATMENT.

Mobilization.—After the operation the joint becomes distended with fluid, particularly after etherization, or if any blood has been left in the joint. This fluid is usually aseptic, and disappears spontaneously. The question then arises as to mobilization of the joint. Until August, 1917, the joint was always immobilized for 7 to 10 days; but, following a visit to Dr. Willems's hospital in August, 1917, we have experimented with the method of immediate mobilization, which undoubtedly is of great value in certain cases. In simple penetrating wounds, where there is not much destruction of muscle, as in wounds of the knee at the line of the joint, immediate active mobilization is advisable.

On the contrary, in those cases accompanied by much destruction of the muscle tissue, or by even minor injury to the bone, such as

lateral fracture of the patella, we have seen infection following immediate mobilization. We considered the mobilization to be the cause of the infection, inasmuch as similar cases treated by immobilization progressed favorably. The fault was apparently not due to faulty technique in mobilization, as we obtained brilliant results by this method in cases of suppurating arthritis. When the joint wound is accompanied by extensive injury to the bone or intraarticular fracture immediate active mobilization is naturally very limited.

The production of hemorrhage probably accounts for the tendency to infection after active mobilization. However that may be, after considerable experience we have given up immediate mobilization in the cases above outlined, and advise immobilization for four to eight days, by which time the process of cicatrization acts as a safeguard.

Active mobilization is chiefly useful in preventing muscular atrophy and stiffness of the joint. In suitable cases, especially wounds of the fingers, hands, and feet, voluntary mobilization should be resorted to as early as possible, always bearing in mind the restrictions above referred to. Stiffness of the joint after a penetrating wound depends, aside from the bone lesions, upon the extent of the cicatricial tissue in the synovial membrane and ligaments. This tissue is formed very slowly and immobilization of the joint for a short period of time has practically no effect upon its formation.

IV. CASE STATISTICS.

During one year, from July 2, 1917, to June 30, 1918, we have treated 190 wounds of the large joints, including 110 wounds of the knee, 23 wounds of the ankle, 14 wounds of the shoulder, 29 wounds of the elbow, 14 wounds of the wrist.

Wounds of the knee.

	Number of cases.	Cases operated on.	Cases cured with and without joint complications.		Total number of cures.	Deaths.
			Without.	With.		
Primary amputations.....	15	15	.....	.....	13	2
Simple penetrating wounds.....	41	38	34	¹ 3	40	1
Wounds with lesions of the patella alone....	16	16	12	1	13	3
Wounds with lesion of femur alone.....	24	22	17	4	21	² 1
Wounds with lesion of tibia alone.....	10	10	7	2	9	1
Wounds with lesion of femur and total destruction of patella.....	4	4	2	2	4	.....

¹ Three not operated on when first seen.

² Two dying before operation.

Wounds of the ankle—23 cases.

Fifteen simple penetrating or osteo-articular wounds treated by immediate suture have given 14 successes and 1 failure (suppuration, secondary astragalectomy).

Two primary astragalectomies without immediate suture; cure with ankylosis at a right angle.

One case of total destruction of the lower epiphysis of the tibia; cure with ankylosis after resection.

Two cases, in which the shattering of the bone and joint involved the tarsus, were treated by primary amputation.

One death in the case of a patient suffering from multiple wounds.

Two periarticular wounds were followed by purulent arthritis; cure obtained by arthrotomy and mobilization.

Wounds of the shoulder—1½ cases.

Nine cases of immediate suture with eight successes.

Four cases of subperiosteal resection of the head without immediate suture; final result unknown.

One case of resection of the head; death after 36 hours (multiple wounds).

Wounds of the elbow—29 cases.

Two deaths due to other lesions (multiple fractures; sacro-iliac wound).

Three simple arthrotomies with immediate suture; three cures by primary intention.

Seven immediate resections, of which two were treated by immediate suture; one success, one failure.

Two without surgical treatment (one T-fracture; one bullet wound).

Four arthrotomies with extensive removal of bone fragments; immediate suture; four cures by primary intention.

Eleven cases with moderate removal of bone fragments; treatment as open wounds. Carrel treatment, active mobilization; final result unknown.

Most of the immediate resections were performed in July and August, 1917. Since that time resection of the elbow has rarely been done.

Wounds of the wrist—1½ cases.

Nine cases of immediate suture; nine cures.

Five cases treated as open wounds (final results unknown).

V. LIMITATIONS OF CONSERVATIVE SURGERY.

Improvement in technique is constantly extending the possibilities of conservative surgery, so that a joint can usually be saved, even when there is extensive destruction of bone. Uniform rules for the conservation of joints can not be definitely established, inasmuch as the individual joints vary as to their functions. For example, in the leg it is necessary to consider not only its mobility but its ability to support the weight of the body, whereas in the arm mobility is the essential feature. We will consider here only the opportunities for conservation in the elbow and the knee.

A. The knee.—Amputation is definitely indicated when the osteo-articular destruction involves the femoral condyles and the tibial plateau to such an extent that the leg would be markedly shortened; also if there is irreparable injury to the popliteal artery. Resection seems to be indicated when the two femoral condyles or the tibial plateau are largely destroyed. If only one of the condyles is destroyed, conservation may be attempted, even if the patella is also fractured. Unquestionably these wounds are among the most important, as the gravity of the patellar injury is added to that of the femur. Furthermore, they are usually produced by large fragments of shell coming with great force, so that the bone is extensively bruised. In these cases the question always arises as to the possibility of conserving the joint or the necessity for resection or even amputation.

In four cases of this kind we have tried conservative treatment. In one of these cases the joint was opened by a large U-shaped incision, fragments of the patella preserved, and the femoral condyle removed. The removal of bone fragments having been incomplete, a severe infection ensued and amputation became necessary.

In two other cases (complete destruction of the patella and shattering of the external condyle) operation was followed by immediate suture and cure by primary intention without joint complications. A transverse incision from the patella to the popliteal space, following the outer border of the knee, made a large opening into the osteoarticular cavity; the patella and most of the external condyle were removed, leaving only a small corner of the condyle, which was almost detached. This small portion was carefully trimmed and preserved in the hope that, small as it was, it would yield some support. On the tenth day the patient got up, and on the fifteenth he walked easily with the help of a cane. After four weeks the knee could be flexed at an angle of 30° , and after a year could be flexed at 50 to 55° . There was no lateral deviation and the patient could easily walk for a long distance.

In a fourth case the lesions were similar to the preceding, but more extensive, as none of the external condyle or patella could be saved. An anterior and a posterior incision were made. A streptococcus arthritis developed, which was treated by passive mobilization. After complete cicatrization the tendon of the quadriceps was transplanted into the patellar tendon. To prevent lateral deviation the patient wore a jointed brace. After six months the flexion of the knee exceeded 90° and the patient could walk for several hours without support.

B. Wounds of elbow.—It is perhaps in wounds of the elbow that the question of choice between conservative operation and resection is most perplexing. If all of the bony extremities are involved, the

decision is easy, as the projectile has already performed the resection and the surgeon has only to complete the operation. If both condyles of the humerus are destroyed, resection must also be done. If, however, one condyle is intact, the question is not so easy. In our opinion, if the external condyle alone is fractured, a subperiosteal removal of splinters is indicated, followed by immediate suture. Fracture of the internal condyle threatens much more seriously the function of the joint, and the surgeon's decision must here be based upon the extent of the injury to the bone and to the soft parts. Partial or total resection of the internal condyle certainly disturbs the statics of the joint, inasmuch as it permits lateral motion, and yet the final result may be excellent as regards mobility and strength, particularly if immediate suture and early mobilization have been possible. This is due to several causes—first, the preservation of a normal unchanged point of contact between the upper arm and the forearm, and, secondly, because the preservation of the periosteum and capsule gives a certain amount of stability and support to the joint.

After an extensive subperiosteal removal of bone, immediate suture is not always practicable on account of the danger of infection. Until recently we treated these cases as open wounds, irrigating with Dakin's solution, but the result of a cure by granulation was always ankylosis. Now, instead of immobilizing the elbow in good position, we use active mobilization, and the results so far obtained have justified the hope that the mobility of the joint can be preserved in many of those cases where ankylosis was previously the inevitable result.

VI. ARTHRITIS FOLLOWING WOUNDS OF THE JOINTS.

VARIETIES.

1. Simple posttraumatic synovial reaction. In these cases a sterile serous exudate, sometimes abundant, appears within a few days. The course is benign.

2. Mild infections, chiefly due to staphylococcus. These differ very slightly from an aseptic synovitis, are only slightly painful, and follow a benign course.

3. Severe infections, chiefly due to streptococcus. These are characterized by a purulent arthritis, with synovial ulceration, and formerly meant the sacrifice of the joint or the arm itself, and possibly death.

TREATMENT.

In 190 cases of joint wounds we have had 21 cases of joint infection, of which 16 affected the knee. The following analysis is of interest:

(a) Five cases of purulent streptococcus arthritis treated without mobilization; results as follows:

One amputation, followed by cure.

Four resections, two deaths, two cures with ankylosis; one of the survivors had a streptococcus septicemia following the resection.

In all, two deaths out of five cases.

(b) Cases treated by arthrotomy and active mobilization.

In three cases of serous staphylococcus arthritis, cure with complete preservation of motion.

In four cases of purulent streptococcus arthritis, cure with almost or quite complete preservation of motion.

In an eighth case (streptococcus infection), death on the tenth day, due to cardio-pulmonary complications.

In a ninth case, suffering from an osteo-articular wound of the knee with streptococcus infection, osteo-articular wound of the elbow, and serious multiple wounds of the soft parts, the weakness of the patient did not permit the use of active mobilization, and amputation was performed on the twenty-second day.

In a tenth case (streptococcus infection) the destruction of the extensor muscles by gas gangrene prevented the use of active mobilization. Passive mobilization was resorted to, and the leg, supported in a sling, was mobilized by the patient himself, active movements of the thigh resulting in passive motion of the knee. The arthritis was complicated by periarticular abscess, but was followed by cure with partial preservation of motion. Mobilization under ether in an attempt to increase the function resulted in a reinfection.

In an eleventh case mobilization was also impossible, and passive motion was resorted to, as in the preceding case. The patella and external condyle had been completely removed, and after recovery from the streptococcus infection the quadriceps tendon was inserted into the patellar tendon. Six months after the injury flexion of the knee exceeded 90° ; the patient wore a jointed brace to prevent lateral motion, and could walk without fatigue for several hours.

During the Flanders offensive in October, 1918, we had many new cases of joint infections, and, with the exception of hip cases, all of which required resection, the treatment by arthrotomy and active mobilization by Willems's method, has given very satisfactory results. It requires, however, much energy on the part of the patient and much time on the part of the doctor. Mobilization must be begun immediately after arthrotomy, and must be systematically continued, or else the classical symptoms of purulent arthritis appear. Certain patients can not succeed in performing the necessary movements, and a certain number of secondary resections can not be avoided. In other cases, by reason of injury to the extensor muscles, active mobilization can not be resorted to; but mobilization of the thigh, as above described, is useful, and the final result is better than that following a resection.



Fig. 1.—Septic knee joint with cellulitis of the soft parts and periostitis of the tibia. The joint cavity and surface of cartilage are shown.

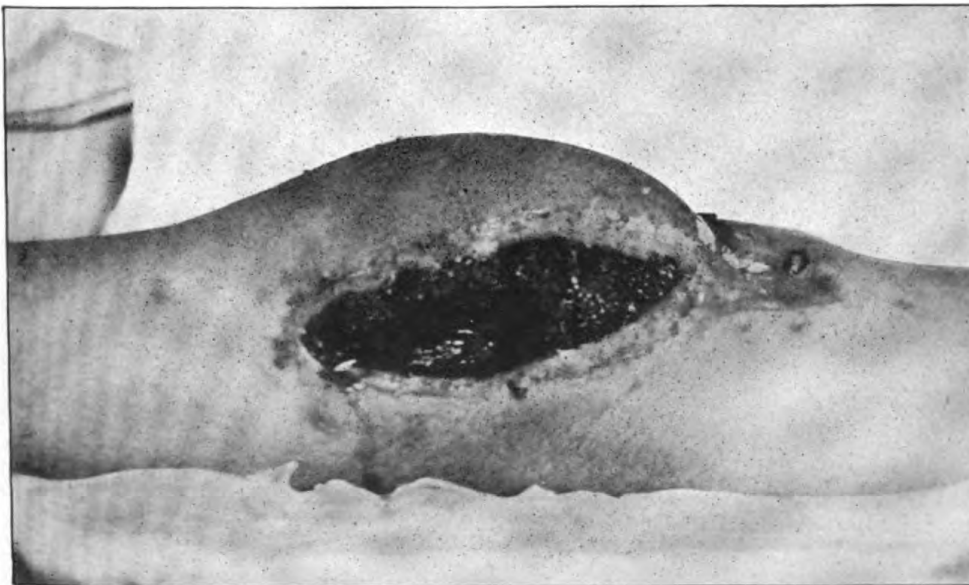


Fig. 2.—Pus escaped from incisions in both sides of the joint. Gradually the joint became aseptic. The bacterial count has dropped from 1 in 3 to 1 in 5 fields.

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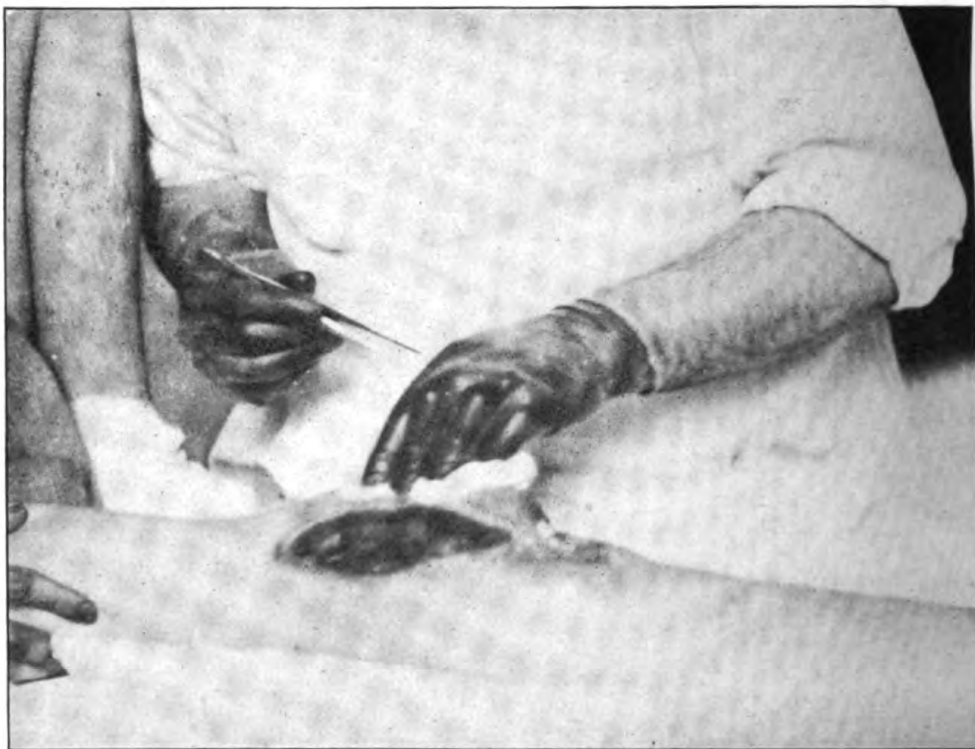


Fig. 3.—Cleaning the opening with ether.



Fig. 4.—Ready for the exercise of the joint so essential to successful treatment.

544-2



Fig. 5.—Beginning to walk.

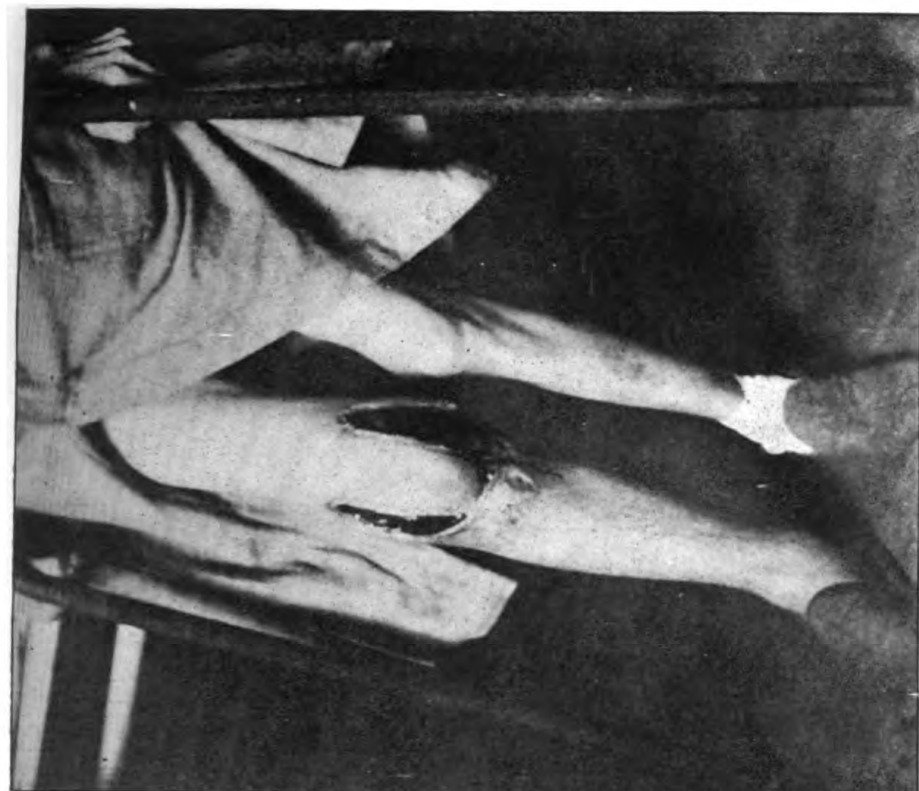


Fig. 6.—Walking with an open knee joint.



Fig. 7.—Flexion obtained as the result of walking.



Fig. 8—Making movements of flexion and extension.

544-4



NEUHEDEL. 7199
BIOPSY OF JOINT.

Fig. 9.—Drawing to show biopsy of knee joint.

CASE ILLUSTRATING WILLEMS'S SURGICAL TREATMENT OF INFECTED JOINTS.

Neuhedel. Admitted on medical service with a diagnosis of acute articular rheumatism. Developed a number of small skin abscesses on anterior aspect of joint, which were opened and drained. Pus finally developed in distended joint and the Willems treatment was instituted. This treatment continued for some weeks with marked improvement of joint condition. An X-ray plate of the leg taken at this time revealed an extension osteomyelitis of tibia not connected with the joint condition. Although one of the large incisions in the joint had been closed by sutures, and although the joint had practically cleared up, an amputation was decided upon on account of the osteomyelitis below the joint.

The illustrations show the progress of the case under Willems's treatment. A biopsy of the joint after amputation shows joint surfaces normal, with the exception of the slight amount of roughening of the synovial membrane on the inner aspect. Drawing shows biopsy findings.

SURGICAL INTERFERENCE IN CHRONIC INTESTINAL STASIS.

The following reports are submitted to illustrate a series of cases operated upon at this hospital for the relief of long-standing constipation—in some cases almost obstipation—with its attendant phenomenon of malaise, depression, and autointoxication. The cases are presented in simple case-history form, and are indicative of the manner in which the "method of working up" data with completeness and exactness has been carried out on our entire series.

The question of chronic intestinal stasis is not a new one, but, for those who may be unfamiliar with the general literature and the nomenclature peculiar to the description of the various pathological processes found, the etiological factors will be outlined briefly and a general description of the meaning of the terms used on the illustrations accompanying the case reports will be given. Quotations will be made from the work of one of our surgical staff, Commander William Seaman Bainbridge, Medical Corps, U. S. N. R. F., who has led the way and given us enlightenment on these very evident mechanical interferences with the human system of sewerage.

According to Lane's theory, in the erect posture assumed by man, there is a general tendency to visceroptosis. This dropping of the abdominal organs gives rise to stress and strain upon the mesentery and its attachments in certain directions, and nature attempts to offset this tendency by the formation of practically bloodless "evolutionary bands" for the purpose of supporting the viscera and

preventing the ptosis. In this effort nature's plan miscarries to a certain extent, and in the process of development the unequal strength of these evolutionary bands in different parts leads to unequal support throughout.

As a consequence of this unequal support the bowel is held up firmly at some points and is allowed to sag at others. The result is an angulation or kinking at the point of support.

The basis of intestinal stasis, therefore, is a mechanical one, the chief factor of which is the abnormal fixation of a given point in the length of the intestine, with a dropping of the tube on either side of this fixed point, thus producing a kink.

It is with these mechanical changes that surgery has to deal, and this surgical interference may be classed, according to the particular part involved and the treatment required, as follows: (1) Misplaced appendix; (2) Ileal kink; (3) Duodeno-jejunal kink; (4) Kinking at the hepatic and splenic flexures of the colon; (5) Kinking at the sigmoid loop; (6) Kinking at multiple points (extreme cases), with many bands as illustrated in the mass of right upper quadrant adhesions in figure 3.

Misplaced appendix.—Displacement and kinking of the appendix occurs in some cases, particularly in the presence of a "rotating mobile cecum." Here the appendix acts as a ligament, twisting the cecum and pulling it downward. The cecum should therefore be anchored in proper position. The stasis which results from slight misplacement and kinking may be relieved by the removal of the appendix and the correction of the kink. In many of these cases the evolutionary bands extend from the ileum to the base of the meso-appendix. (Fig. 5.) The cutting of these and the correction of the resulting kink will effect a cure after appendectomy has failed.

Ileal kink.—Kinking of the ileum at different points along the terminal coil may be caused by evolutionary bands. In uncomplicated cases, where the kinking is of a slight degree, relief may be obtained by simply cutting the bands transversely and sewing up longitudinally. Very broad bands are sometimes found, giving rise to marked angulation and very pronounced stasis.

Duodeno-jejunal kink.—Kinking of the duodeno-jejunal junction is usually secondary to ileal stasis. The first part of the duodenum becomes greatly distended. Adhesions about the pylorus, with more or less marked kinking and obstruction of this part of the alimentary tract, may complicate such cases. Correction of this kink may be accomplished by division of the bands and the placing of the upper part of the jejunum against the under surface of the transverse meso-colon.

Kinking at the hepatic and splenic flexures of the colon.—This is accomplished by the fixation of the portion of the gut involved and

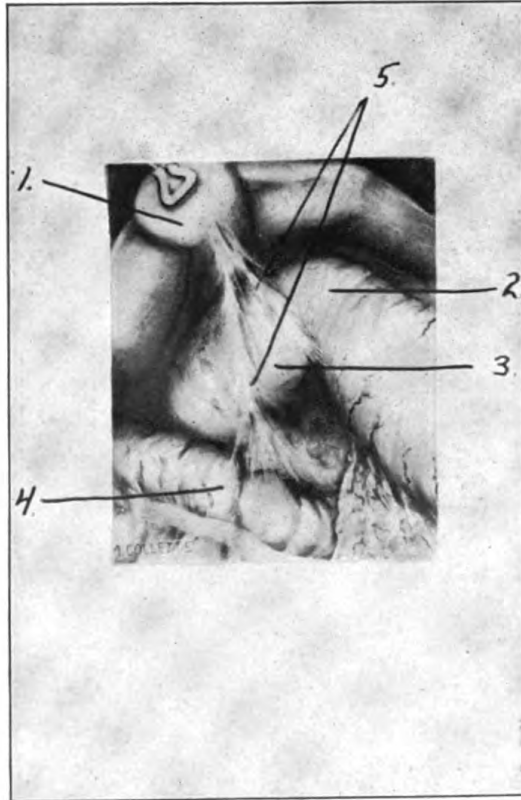


Fig. 1.—(1) Gall-bladder distended. (2) Pylorus. (3) Dilated duodenum. (4) Transverse colon. (5) Y-band with two descending arms. One supports transverse colon across duodenum. The other, just to the distal side of the pyloric sphincter, constricts the duodenum.

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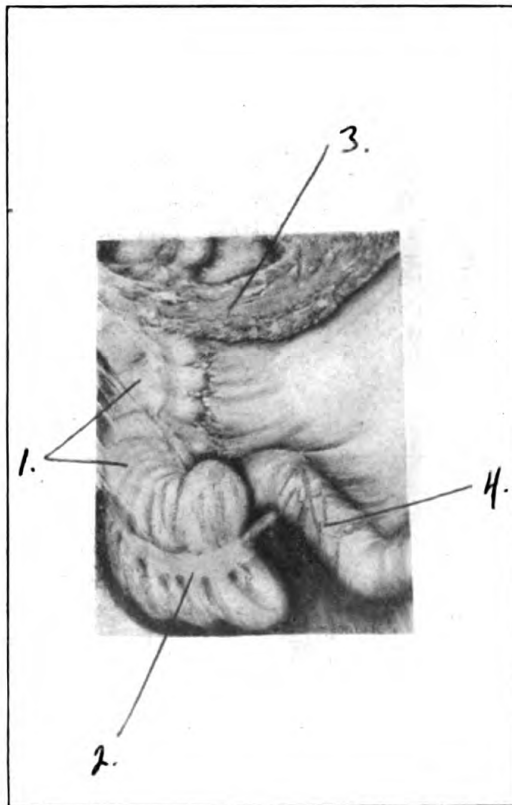


Fig. 2.—(1) Pericolic bands, the so-called Jackson membrane, attempting to hold up a rotating, mobile cecum. The juncture of cecum with ascending colon forms a point of obstruction when the mobile cecum seeks to rotate from above downward and from without inward. (2) Large, mobile, sacculated cecum rotated inward. The posterior muscle band is forward and below. (3) Marked band of great omentum crossing ascending colon just below hepatic flexure. (4) Appendix hung beneath terminal ileum.

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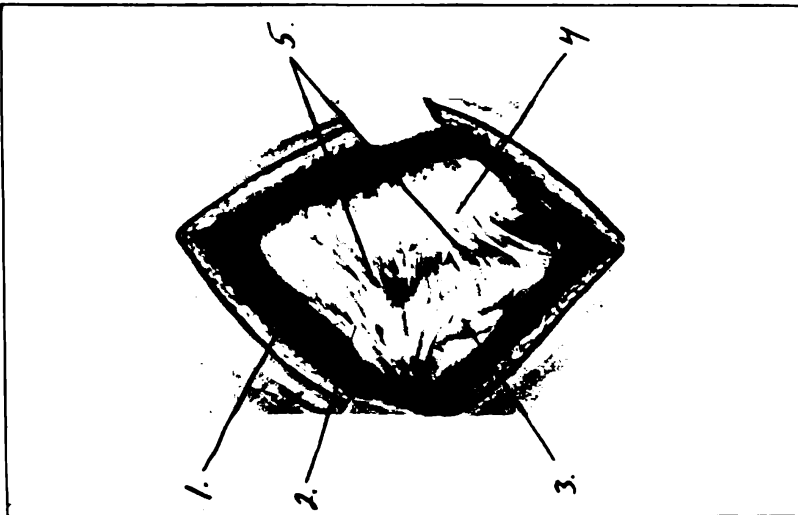


Fig. 3.—(1) Edge of liver. (2) Hepatic flexure beneath dense adhesions anchoring edge of right lobe of liver. (3) Ascending colon. (4) Transverse colon. (5) Mass of adhesions binding ascending colon to transverse colon with production of an acute kink at the hepatic flexure. Beneath the mass the pyloric end of the stomach and the descending portions of the duodenum were tightly agglutinated.

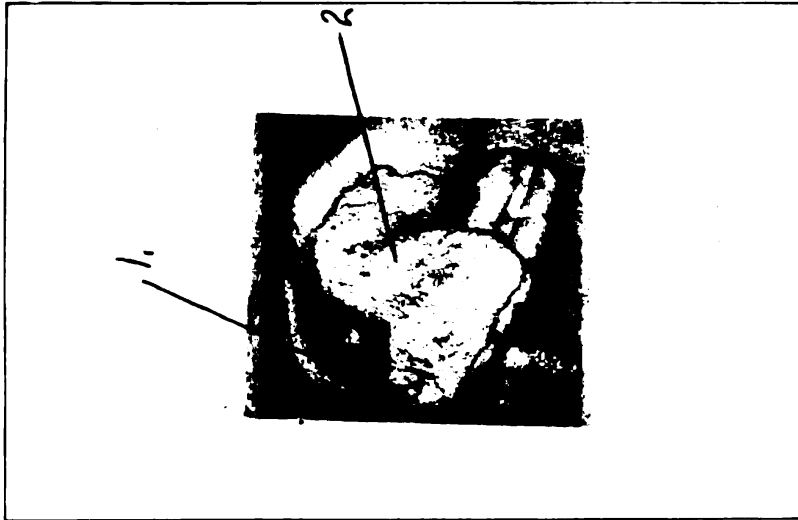


Fig. 4.—(1) Portion of great omentum sutured to edge and under surface of liver to cover the raw surface consequent on dividing the mass shown in figure 3. (2) Another omental transplant sutured over raw surfaces on duodenum, stomach, and pylorus.

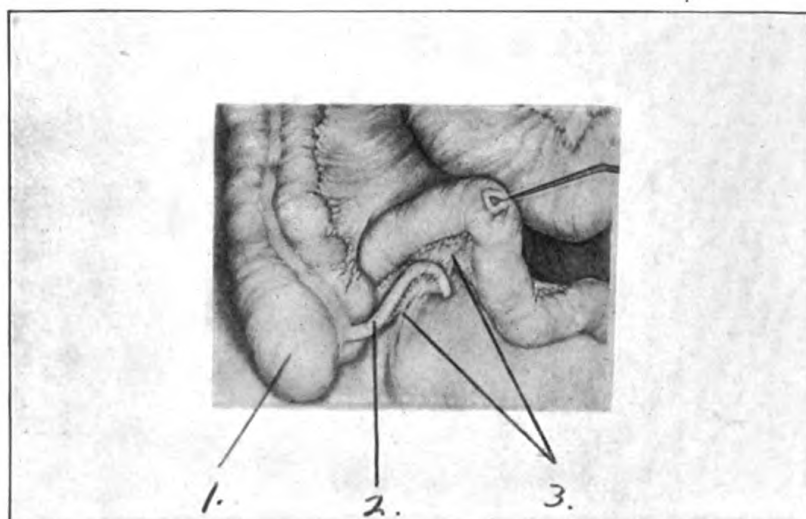


Fig. 5.—(1) Cecum low in the pelvis. (2) Underhung appendix. (3) Beginning ileo-pelvic band. One branch goes to brim of pelvis, the other passes obliquely up under the terminal ileum.

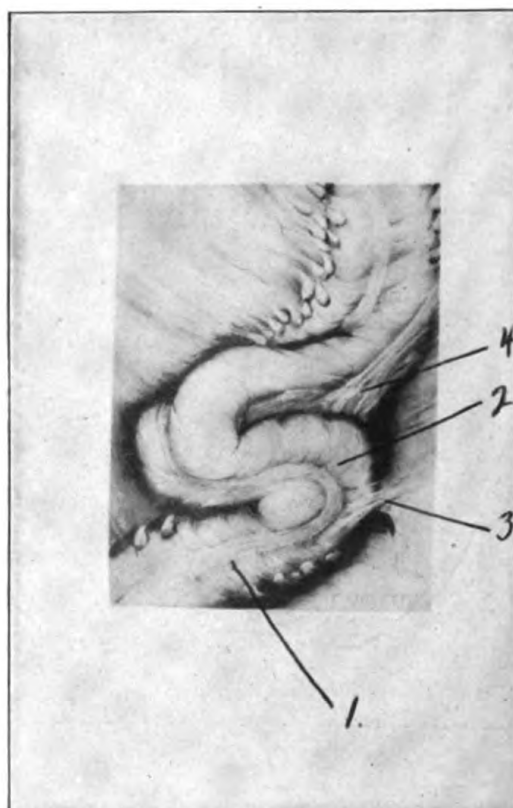


Fig. 6.—(1) Pelvic colon. (2 and 3) Accentuation of last kink. (4) Adventitious band above, about 6 inches on the convexity of the gut.

546-4

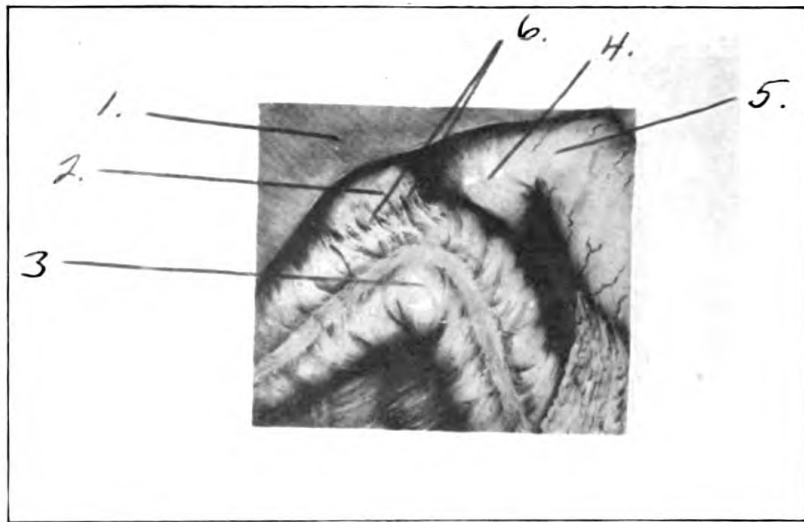


Fig. 7.—(1) Liver. (2) Fundus of gall-bladder. (3) Transverse colon. (4) Duodenum. (5) Pylorus. (6) Tight bands holding gall-bladder to transverse colon across duodenum. They extend from tip of fundus to end of common bile duct.

the resultant dropping down of the dependent portions around this fixed point.

Kinking at the sigmoid loop.—Evolutionary bands may form in such a manner as to bring together the two ends of the sigmoid loop.

Mobile cecum.—A descended and from without inward rotated cecum, the result of nature's compensatory effort to relieve its stagnant contents produced by fixation at abnormal points.

The relief of these mechanical errors on the part of nature, when absolute and permanent, can only be a mechanical one. The "mechanics of it" and the technique involved when once recognized is a simple one. The bands are cut transversely and sutured longitudinally. The serious surfaces of the cut edges are carefully infolded and all raw surfaces entirely eliminated. This relieves the fixation, straightens out the kink, and leaves the bowel with an unbroken peritoneal surface, around which there can be no further adhesions.

The following case reports are self-explanatory. The illustrations were drawn in the operating room at the time of operation. The operative finding and procedure were dictated as the work progressed.

CASE I. Patient N. B. L. F., three.

1. *Clinical history.*—Admitted from receiving ship at New York with "diagnosis undetermined." Present complaint, long-standing constipation. Headaches, pains in back, general lassitude. Anemia.

2. *X-ray findings.*—Peculiar stomach and duodenum shadow suggestive of pathology in region of pylorus. Cap negative; 48 hours; enlarged cecum with long and kinked appendix filled with bismuth.

3. *Operative findings.*—Right para-rectus incision 5 inches long. On opening the abdomen there was found a band beginning $1\frac{1}{2}$ inches from fundus of gall-bladder on its undersurface, extending backward to the gastro-hepatic omentum. This band was slightly to the right of the center line of gall bladder. (Fig. 1.) At its attachment to the gastro-hepatic omentum it divided, one division extending just to the distal side of the pyloric sphincter, the other going across the duodenum and being lost in the support of the transverse colon. (Fig. 1.) On holding up the gall-bladder this band was clearly seen, about $3\frac{1}{2}$ inches long, extending from before backward and supporting the transverse colon, which tended to be enteroptotic when traction was made on it a few inches beyond the hepatic flexure. The band was very strong and looked almost like sear tissue.

There was a widely dilated cecum, with large sacculations descending from above downward and rotated from without inward, the posterior muscle band being entirely forward and below. (Fig. 2.) The postero-lateral shelf of the abdominal wall was markedly developed and irregular. There was a marked band of great omentum lying

across the ascending colon, just below the hepatic flexure, causing a distant angulation of the large intestine. (Fig. 2.)

The appendix was underhung and its mesentery markedly developed and situated under the terminal ileum, the small intestine hanging to one side and the rotated, descended cecum to the other side. (Fig. 2.)

4. *Operative correction.*—Bands about gall-bladder and cecum were bisected transversely and sutured longitudinally with raw surfaces turned in. The appendix was removed and the cecum anchored by interrupted sutures to the postero-lateral shelf. Closure as usual.

CASE II. R. E. J. F., third class.

1. *Clinical history.*—Patient admitted with diagnosis of ulcer of stomach. Operated one year previous for ulcer of duodenum. Complaints of pain in abdomen, loss of weight, general weakness.

2. *X-ray findings.*—Stomach shows marked ptosis. Cap O. K. Pressure or adhesions cause constriction of duodenum, six hours. Considerable gastric residue lying low in pelvis. Marked ptosis of transverse colon. Slight ileal delay. Twenty-four hours: Marked ptosis of colon. Forty-eight hours: Marked ptosis of colon, delay in emptying.

3. *Operation.*—Right pararectus incision 6 inches long; 1 inch to inner side of scar of a previous operation. A great mass of adhesions was found in the right upper quadrant (fig. 3), anchoring the edge of the right lobe of the liver to the abdominal wall at the side of the old scar. The pyloric end of the stomach and the ascending and descending portions of the duodenum were tightly agglutinated together. (Fig. 3.) In this mass was the hepatic flexure of the colon. (Fig. 3.) Beyond the adhesions the transverse colon dropped acutely. (Fig. 3.) All these adhesions were separated, leaving large areas of raw surface, including the edge of the liver and its under surface, the abdominal wall, anterior surface of ascending and descending portions of duodenum, apex of hepatic flexure of colon, and anterior portion of stomach from the pylorus downward, extending about 3 inches along the greater curvature. The gall bladder was found to have a thin band attaching it on its under surface to the duodenum. This was separated.

A portion of the great omentum was removed from its attachment to the large bowel near the splenic flexure and carefully sutured over the raw surfaces on the duodenum, stomach, and pylorus. (Fig. 4.) Another piece of omentum was sutured on the edge and under the surface of the liver. (Fig. 4.) The jejunum was noted to be very much thickened and enlarged to the caliber of the large intestine. The ileum was normal.



Fig. 1.—Clean, healthy area just previous to grafting.

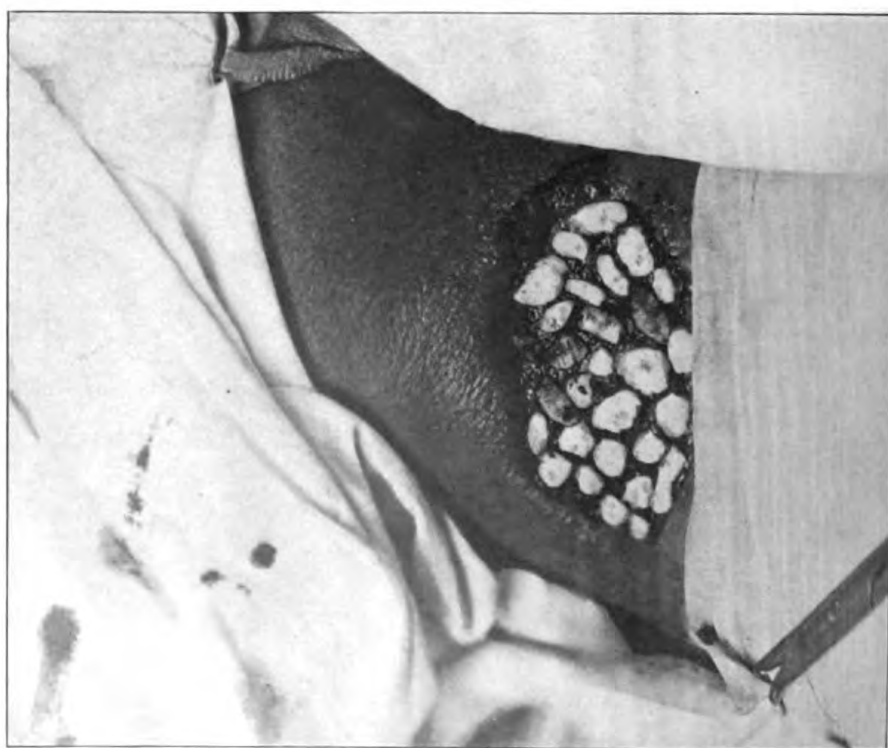


Fig. 2.—Pinch grafts in position.

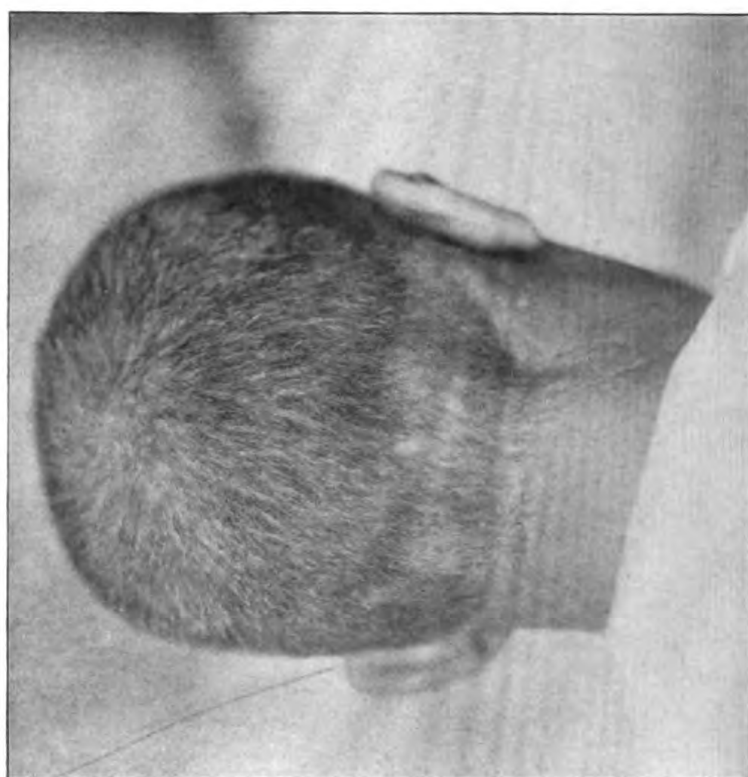


Fig. 3.—End result.

A beginning ileo-pelvic band was found with two divisions, one going down to the brim of the pelvis, the other passing obliquely up under the terminal ileum. (Fig. 5.) These were treated as usual and the under-hung appendix removed. There was a marked accentuation of the last kink of the pelvic colon, which was corrected. (Fig. 6.) An adventitious band lay above, about 6 inches on the convexity of the gut (fig. 6), easily accounting for the X-ray picture showing an hourglass sort of contraction of the pelvic colon, with a space filled with bismuth. Closure as usual.

4. *Subsequent findings*.—Unfortunately, on the fourth day following the operation, the patient developed a lobar pneumonia, from which he died one month later. The autopsy report is of great interest: "The liver was entirely free from adhesions. A row of stitches along the anterior margin showed where omental tissue had been stitched. The anterior and posterior walls of the stomach were free from adhesions. The transverse colon was free from adhesions. The omental transplant was in place and alive. The stomach and duodenum were opened and found to be free from obstruction. An old healed ulcer from the pyloric sphincter was demonstrated."

CASE III. Patient, H. F. S. Age 29.

1. *Clinical history*.—Admitted from U. S. S. *Pennsylvania*. Complaints of chronic constipation. History of using cathartics over a period of years. Dizzy spells, with periods of malaise and autointoxication, relieved by brisk catharsis.

2. *X-ray findings*.—Stomach and cap negative. Slight ptosis in erect posture; 6-hour slight gastric residue. Appendix filled; fixed hepatic flexure. Twenty-four hours: appendix still filled. Slight ptosis in erect posture. Forty-eight hours: appendix still filled; delay in emptying of colon.

3. *Operation*.—Right para-rectus incision 5 inches long. Gall-bladder found tightly adherent to the transverse colon, across the duodenum, from its fundus to the end of the common bile duct. (Fig. 7.) This adhesion was separated in the usual manner, raw surfaces being turned in, employing one enfolding stitch on the gall-bladder.

The appendix was under-hung and the cecum was filled with nodular masses of feces. Appendix was removed and beginning ileo-pelvic band corrected.

CARREL-DAKIN TREATMENT OF LARGE CARBUNCLE.

The following case history is of interest, in that it demonstrates how quickly and thoroughly the Carrel-Dakin treatment cleans up large infected areas when properly applied and pushed to the limit during the acute period.

Patient.—R. A. J. Age 45. Supernumerary. Admitted December 23, 1919, with large sloughing mass covering entire back of neck. Under general anesthesia a circular necrotic mass about 4 inches in diameter was excised. The area was cauterized with phenol and packed with dry gauze. (It is regretted that no picture was taken to illustrate the size and severity of the necrotic area.) The following day three Carrel tubes were placed and the fluid instilled into the area every hour. January 2, 1920, one week following the excision, the wound was clean; no slough present and bacterial count down to 3 per field. One week later the area had completely filled in with firm, healthy granulations, and about 30 small pinch grafts were taken from thigh and placed in position. (Figs. 1 and 2.)

January 27, 1920, the patient was discharged healed. (Fig. 3.)

SARCOMA OF FOOT.

H. A. K. A. S., United States Navy. Age 16. Admitted to United States Naval Hospital, New York, N. Y., January 28, 1920. Diagnosis: Abscess of foot.

Previous history.—About 18 months prior to admission patient was injured by a blow on the dorsum of the right foot. Following this injury a small slow-growing tumor appeared. This swelling caused very little pain or discomfort until a very short time before his admission to the hospital, when it began to trouble him. He then went to the sick bay and a small incision was made into the tumor. No pus was found.

On admission to this hospital, three days later, the patient's foot showed a beginning cellulitis and a tumor on the dorsum, over which a three-fourths inch incision had been made. Under local anesthesia a portion of the tumor was excised for microscopic examination and the wound was thoroughly cauterized with the actual cautery.

On the following day the patient had a temperature of 103.8°. His foot and leg were swollen and inflamed, and the inguinal and saphenous glands were enlarged and tender. There were also signs of phlebitis.

The patient continued to show signs of marked toxemia, and also to show some chest symptoms. On February 8, 1920, he presented all the symptoms of a frank lobar pneumonia. His lung condition gradually cleared up, but in the meantime his inguinal and saphenous glands broke down and had to be incised and drained. Repeated Wassermann tests were made, but his blood was anticomplementary and no definite result could be obtained.

The pathological report on the specimen of tumor from the dorsum of the foot was "round-celled sarcoma." Amputation of leg was



Fig. 1.—Sarcoma of foot with abdominal metastasis. Admitted to hospital with diagnosis of abscess of foot.



Fig. 2.—Sarcoma of foot.

550-1



Fig. 3.—Metastasis in the glands above and below Poupart's ligament.



Fig. 4.—Metastasis in popliteal space.

550-2



Fig. 1.—Spastic condition of right foot in Jacksonian epilepsy.



Fig. 2.—Spastic condition of foot in Jacksonian epilepsy.

recommended, but the patient absolutely refused operation. The tumor grew rapidly and very shortly metastatic growths appeared in the popliteal space, lumbar region, abdomen, and right lung. On April 22, 1920, the patient died.

This case demonstrates the following points:

(1) The possibility of any tumor with a similar history being malignant and the seriousness of incising such a tumor without taking measures to prevent its spread by cauterization.

(2) An acute pyogenic infection does not inhibit or protect when growth is malignant.

(3) The acute infection in this case interfered with the Wassermann tests.

JACKSONIAN EPILEPSY WITH SEVERE SPASTIC CONTRACTURE OF LEG AND FOOT.

The following brief case report is of interest in that it is an example of severe muscular spasm causing contracture deformity, which became so severe and acute that it necessitated some immediate surgical interference.

Patient.—J. J. H. F. first class, admitted to this hospital November 13, 1919, with diagnosis of contracture of right tendo-Achillis.

History.—Seven years previous to admission patient was hit on the head with a bottle over motor area on left side. One year after this injury he commenced to have spasms of the muscles of the right leg.

Condition on admission.—Hammerlike contracture of toes of right foot. Contracture shortening of tendo-Achillis, causing foot to remain fixed in extreme extension. Marked degree of spasticity of all muscles of foot and leg. (Figs. 1 and 2.)

Further history.—Patient developed severe epileptic seizures, characterized by marked clonic spasms of muscles of leg. These spasms were of such severity that it was necessary to use chloroform, pushed to the point of muscular relaxation, before any relief was obtained. Morphine and the usual sedatives were useless.

Under observation and the usual sedative administration of bromides, etc., the condition grew steadily worse, the seizures increasing to one a day, until it became imperative to institute some form of procedure in order to relieve the severity of the spasms, with the attendant possibility of muscle rupture, which at that time could only be relieved by full anesthesia.

With this condition to meet craniotomy was performed on December 11, 1919. The longitudinal sinus was unusually wide, and in making the bone flap this was perforated. There was moderate tension on the dura over the Rolandic area. The dura was not

opened. The sinus was packed and the patient went on to an uncomplicated surgical recovery.

Post-operative history.—The patient remained in the hospital until February 24, 1920. During this period he had but one seizure, which was augmented by accidentally striking his head on the bedpost. This occurred on the tenth day following operation. The patient was discharged to civilian life. He was last seen May 1, 1920. He has had no further attacks, walks with comfort, and feels well.

A CASE OF OSTEOMA OF THE HUMERUS.

The following case with X-ray print illustrates the possibility of making an error in diagnosis by relying entirely on X-ray interpretation.

The patient, J. A. W., was admitted September 8, 1919, with the diagnosis fracture, left humerus. Entries in health record are as follows:

On admission, X-ray shows some bony deformity of humerus, near head. Transverse fracture of head of bone.

September 16, 1919, United States Naval Hospital, New York. X-ray shows stripping of periosteum from both inner and outer surfaces of upper one-third of humerus. Most careful study shows well-marked epiphyseal line, but no fracture. (Fig. 1.)

September 22, 1919. X-ray shows no change.

September 24, 1919. Wassermann negative. Incision made over tumor mass. Small mass, which appeared to be an osteoma, and two small spurs removed. Periosteum closed over and wound closed.

September 29, 1919. Wound healed. Report of removed specimen received from United States Naval Medical School, Washington, D. C., as follows: Gross specimen consists of a piece of bone tumor, 7 by 2 c. m. in size. Cut section shows tissue cancellous in structure and in part hemorrhagic.

Microscopic examination: Bluish pink, well-developed bone trabeculae; cartilage formation at periphery.

Diagnosis, Osteochondroma.

October 16, 1919, X-ray shows considerable improvement.

November 4, 1919, X-ray shows condition further improved.

November 11, 1919, to duty, well.

CASE REPORT: METASTATIC BONE INFECTION RESEMBLING SARCOMA.

Patient.—C. H. N. Age, 21. Seaman, U. S. Navy. Admitted to this hospital October 13, 1919, with diagnosis of acute arthritis. At time of admission left leg was greatly swollen and painful; motion restricted, with general picture of acute inflammatory knee.

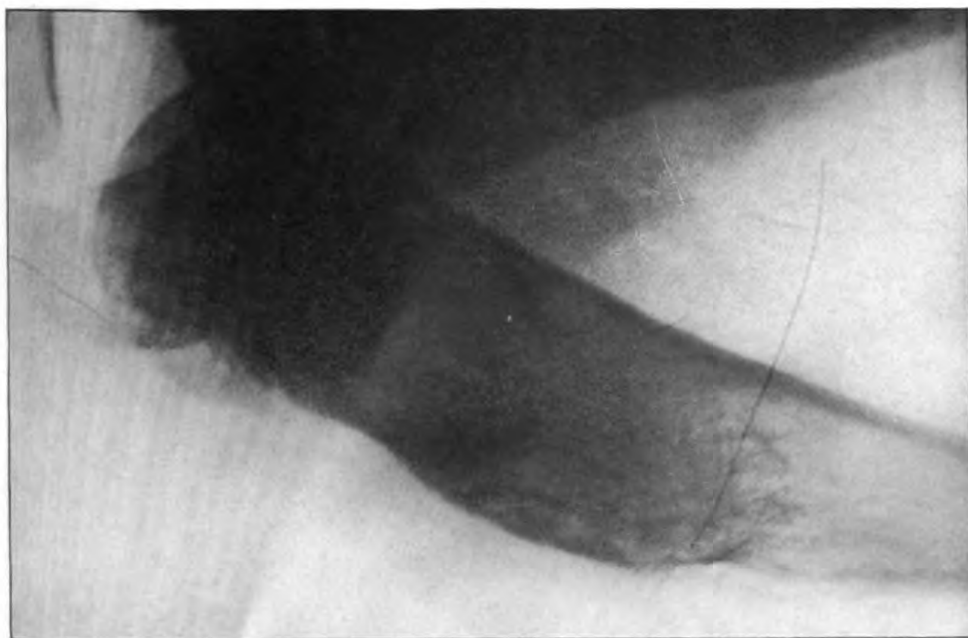


Fig. 1.—Benign tumor of humerus which might be mistaken for beginning sarcoma.



Fig. 2.—Tumor of humerus. Marked improvement.

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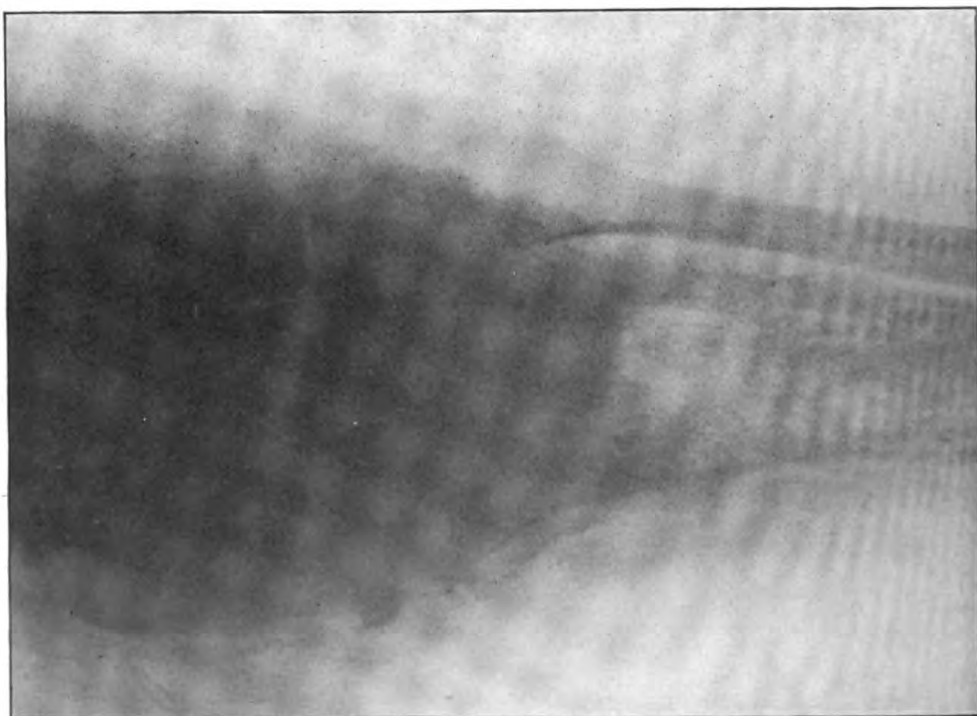


Fig. 1.—Extensive osteomyelitis of left tibia with a purulent knee necessitating amputation of femur. The later infection of radius probably developed from this focus.

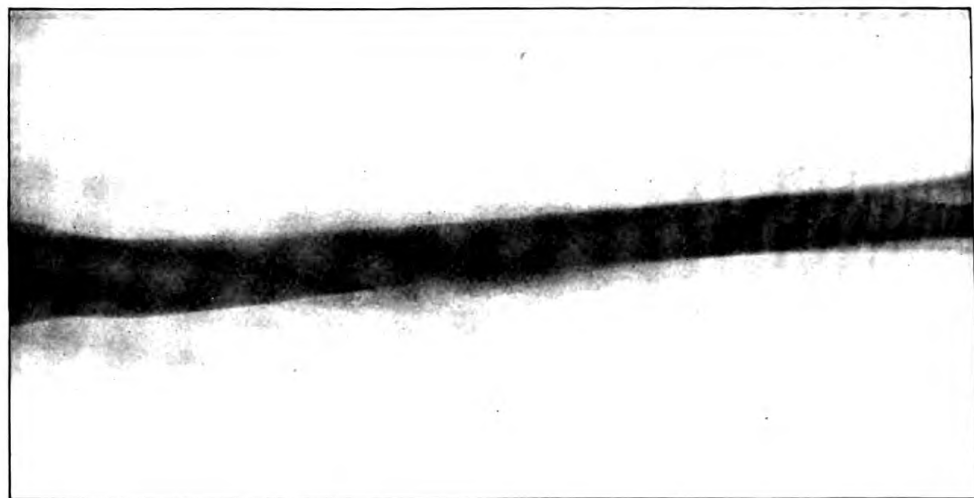


Fig. 2.—Small cyst-like cavity, middle of left radius.

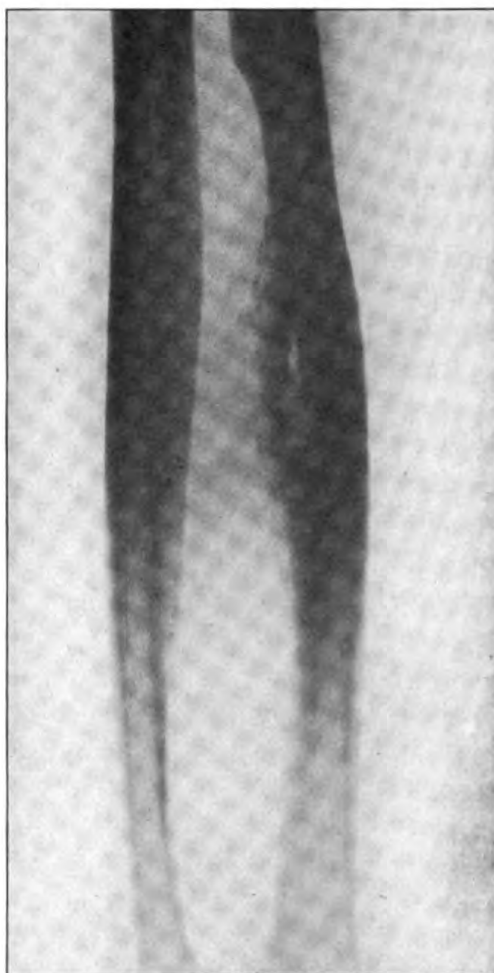


Fig. 3.—New growth in radius suggesting osteosarcoma. It proved to be bony proliferation and periosteal inflammation, probably of metastatic origin.

October 22, 1919, condition had grown steadily worse and it was deemed advisable to open and drain the knee joint. Two 6-inch lateral incisions were made, pus evacuated, and patient placed on active movement of knee joint (Willems's treatment).

January 22, 1920, patient's general condition failed to improve, and, due to impending general sepsis, it was deemed advisable to amputate the leg above the knee joint. Picture at this time showed acute periostitis over the upper anterior surface of the tibia, extending from the articular surface to just below the tubercle. (Fig. 1.) Stump healed and patient made an uneventful recovery.

March 10, 1920, patient began to complain of pain in the left forearm. Examination showed slight swelling and redness, with marked tenderness over middle of left radius. Slight bony swelling could be felt beneath area. X-ray picture at this time showed small cyst-like cavity at inner surface of middle of left radius. (Fig. 2.) The condition grew steadily worse, pain, swelling, and general symptoms of sepsis increasing.

March 25, 1920, X-ray showed wall of cavity of radius broken; much irregular bony proliferation and periosteal inflammation about site. (Fig. 3.)

April 5, 1920, tumor mass enlarging steadily. It was deemed advisable to partially resect radius, and, with a tentative diagnosis of metastatic infection from original focus in knee or a rapidly growing acute sarcoma, the mass was resected this date.

May 1, 1920, laboratory report from United States Naval Medical School, Washington, D. C., as follows: Specimen, bone. Chronic inflammation involving bone, bone marrow, and periosteum. Microscopical examination of tissue received shows marrow replaced by fibrous tissue with an erosion and in places a proliferation of osseous tissue, and marked thickening and infiltration, with cells of inflammatory origin of the periosteum. The histo-pathology is that of a chronic inflammatory condition (chronic osteomyelitis), probably bacterial in origin. There is no evidence of malignancy.

May 20, 1920, patient made an uneventful recovery, with no further proliferation or distant foci, and the gap in the radius will be replaced by a bone graft.

WOUND CLOSURES FOLLOWING CARREL-DAKIN TREATMENT.

This report comprises a series of eight cases whose convalescence was materially hastened by the judicious employment of the Carrel technique and Dakin solution. A large amount of the success must also be credited to the proper preparation of the various wounds by

adequate exploration and removal of devitalized tissue at the time of primary and subsequent operations.

Too much must not be expected of the Carrel-Dakin treatment per se. It has its place in surgery in the treatment of infected wounds, but even here one must not be too dogmatic in statement as to its indications and the length of time of application. Much depends upon the individual surgeon and his experience as to the number, length, and proper disposition of tubes; the appliances for fixation or motility and other adjuvants for the welfare of the patient and his condition.

CASE 1. K. M. A. S., U. S. Navy, 18 years of age. Admitted to this hospital January 5, 1920, with a diagnosis of fracture, right femur, compound. He wore a spica plaster of Paris cast of hip and right thigh, presenting two discharging sinuses on the outer anterior surface of the upper third of the thigh. On January 30, 1920, under ether anesthesia, two linear scars were removed down to the bone, and grumous material and seven sequestra were removed; the bony union was not disturbed and the wound was packed with gauze to control oozing. On February 2, 1920, the gauze was removed and nine Carrel tubes were inserted to all parts of the wound. Hourly instillations of Dakin solution were given. Daily dressings with rearrangement of tubes and irrigation were made and smears for bacteria count taken until February 18, 1920, 18 days after first operation when, the bacteria count having been persistently below 1 per 5 fields from different parts of the wounds, operation was again performed under ether and the wound sutured. Convalescence was uneventful and union took place by primary intention as per figure 1.

In this case sequestrectomy and thorough cleansing were undoubtedly large factors toward success, but we feel certain that without Carrel-Dakin treatment closure would not have been possible, at any rate not within so short a time.

CASE 2. H. O. O., Sea., U. S. Navy, 20 years of age. Admitted to this hospital on March 3, 1920, with a diagnosis of abscess of popliteal space. This began insidiously about seven months previously, draining continuously. On March 14, 1920, under local anesthesia with 2 per cent novocain, the abscess was opened widely and two Carrel tubes were inserted. The bacteria count dropped rapidly from infinity to 1 per 9 fields, and on March 22, 1920, the tubes were discontinued (Fig. 2) and the wound was strapped to effect better approximation. Dry dressings were applied until April 4, 1920, 21 days after operation, when the wound had closed spontaneously (Fig. 3).

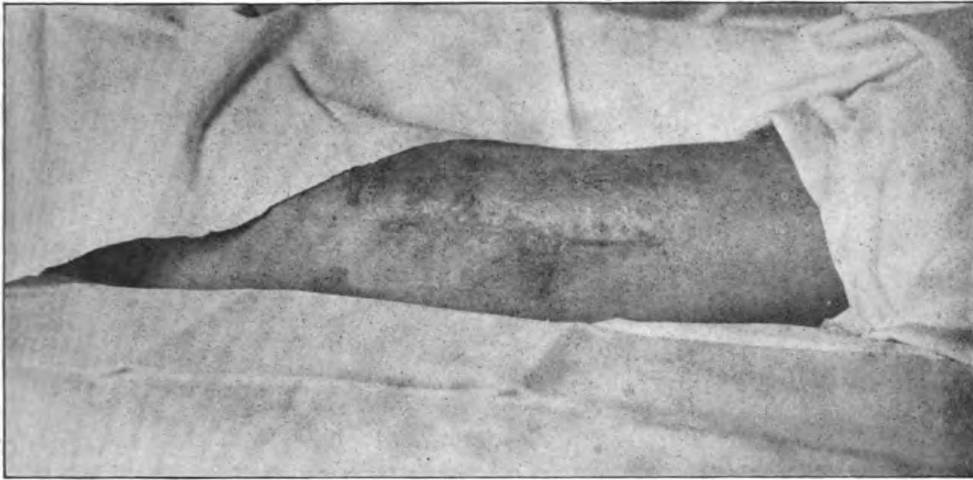


Fig. 1.—Case: K. M. Union by primary intention.

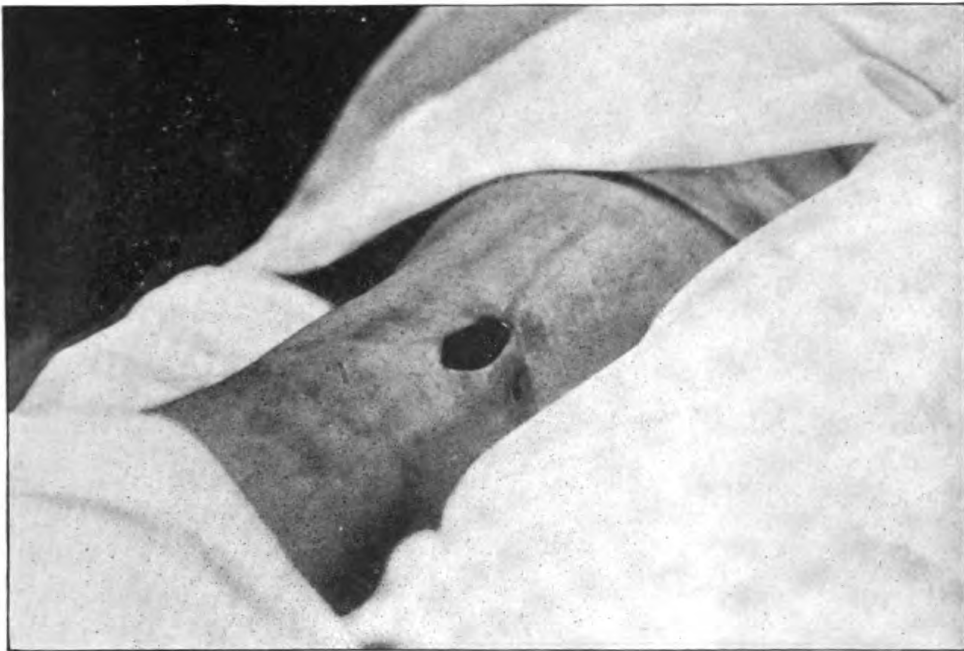


Fig. 2.—Case: H. O. O. Tubes discontinued. Wound ready for strapping.

554-1



Fig. 3.—Case: H. O. O. Wound healed.



Fig. 4.—Case: G. A. Healing wound of osteomyelitis.

554-2



Fig. 5.—Case: G. A. Size of wound now permits of only two Carrel tubes.



Fig. 6.—Case: G. A. Closure.

554-3



Fig. 7.—Case: A. M. Closure without suture or strapping.

555

Here, again, due credit must be given the Carrel-Dakin treatment, although the initial operation with cleansing and preparing the wound for the tubes was, we think, the deciding factor for success or failure.

CASE 3. G. A., private, U. S. Marine Corps, 26 years of age. Operated upon December 12, 1919, for sequestrectomy of part of the old bone graft of the left tibia. Scar excised, dead bone removed, and wound packed. December 14, 1919, packing removed, four Carrel tubes inserted, and hourly instillations of Dakin solution begun. On January 26, 1920, the condition and size of wound permitted of only two tubes as per Figures 4 and 5. On February 10, 1920, the bacteria count having been below 1 per 5 fields, operation was performed under ether anesthesia. The edge of the scar was cut away, a flap of muscle $3\frac{1}{2}$ inches swung into the cavity of the dead space, and the wound closed. Convalescence uneventful. Union by primary intention (Fig. 6).

CASE 4. A. M., S. C. Second class, U. S. Navy, 22 years of age. Admitted with compound fracture of right mandible, due to fall. Teeth were wired in good alignment, with excellent occlusion. On February 4, 1920, after operation for removal of dead bone and curettage of fistulous tract, a small tube was inserted one-fourth inch into cavity and instillations of 1 per cent chloramine under low pressure were begun. The wound granulated rapidly and on February 10, 1920, six days after operation, it was so superficial that it was thought advisable to use Daufresne's paste.

On February 17, 1920, the wound closed spontaneously, without the aid of sutures or adhesive strapping, leaving a shallow dimple. (Fig. 7.)

CASE 5. C. J. P., Private U. S. Marine Corps, 19 years of age. Admitted to this hospital from France with a discharging wound of the left buttock. He had, in addition, displacement upward of head of femur, with bone loss, and loss of bony structure of the body of the ischium and acetabulum with ankylosis of the hip joint. On July 21, 1919, under ether, a longitudinal incision of 5 inches over old scar was made and another of 3 inches, mediad and perpendicular to it. The sciatic nerve was exposed and freed from the scar tissue; acetabulum, head, and neck of femur curetted and the wound packed with gauze. The Carrel treatment not having been instituted in our hospital up to this time, he was dressed daily with gauze packing and rubber drains. The incisions drained profusely and with foul odor until October 30, 1919, when a second operation was performed. Scar resected, dead bone and débris removed from

ilium, and wound packed with gauze to control oozing. Two days later the packing was removed; Carrel tubes were inserted and hourly instillation of Dakin solution was begun. The foul odor disappeared and the discharge lessened. On November 28, 1919, the tubes were discontinued and the wound was strapped. Healing took place rapidly, and on December 15, 1919, the wound was entirely healed. (Fig. 8.)

It is interesting to parallel the progress in the same wound treated with and without the Carrel-Dakin method.

CASE 6. G. J. A., F. third class, U. S. Navy, 31 years of age. Was admitted to this hospital with faulty union between the fragments of an old compound fracture of the tibia. X-ray showed probable bone necrosis, and on October 1, 1919, the scar was dissected away, the necrosed bone removed, Carrel tubes were inserted, and hourly instillations of Dakin solution begun. By November 11, 1919, the wound had granulated to the surface and the bacteria count was below 1 per 5 fields. On December 5, 1919, the bony union being secure, skin transplants were attempted, but these soon sloughed because of tension and poor blood supply, and Carrel-Dakin treatment was again resorted to (fig. 9) until January 5, 1920, when, under local anesthesia, pinch skin grafts were transplanted from the right thigh to the left leg and covered with silver foil. Because of the sterile field produced by Dakin solution, the grafts became adherent and convalescence was uneventful. (Fig. 10.)

CASE 7. C. C. R., Private, U. S. Marine Corps; 25 years of age. Patient was admitted with discharging sinus of a badly united compound fracture of the left femur, caused by a rifle bullet. Carrel-Dakin treatment was instituted for nine days and the wound closed spontaneously. It remained closed for five days and then broke open, discharging considerable pus. The sinus tract was then resected, several sequestra were removed, and the wound was closed over a Carrel tube. Hourly instillations were continued until 14 days after the operation. The bacteria count having dropped from infinity to 1 per 9 fields, the tube was removed, and the wound allowed to close. (Fig. 11.)

CASE 8. R. A. K., midshipman, British Navy, 17 years of age. Was admitted from H. M. S. *Renown* with extensive gangrenous laceration of the right buttock, extending down to the deep fascia. November 12, 1919, operation was performed, gangrenous area resected, and Carrel-Dakin treatment begun. (Fig. 12.) On December 15, 1919, the wound being clean, operation was again performed (fig. 13) and four skin flaps, made by undermining both sides of the

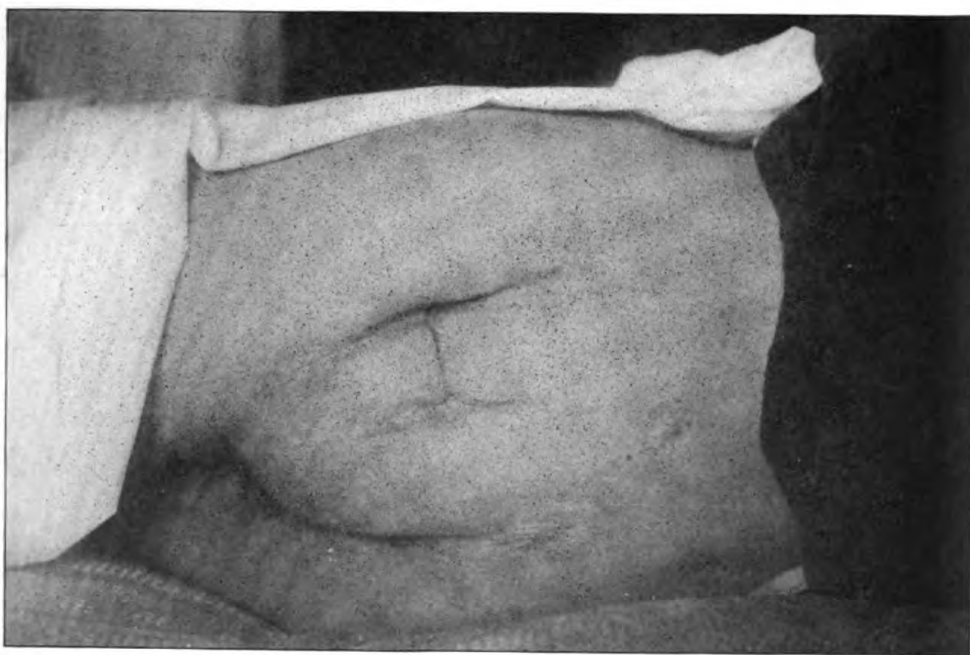


Fig. 8.—Case: C. J. P. Closure in 17 days after removal of tubes.

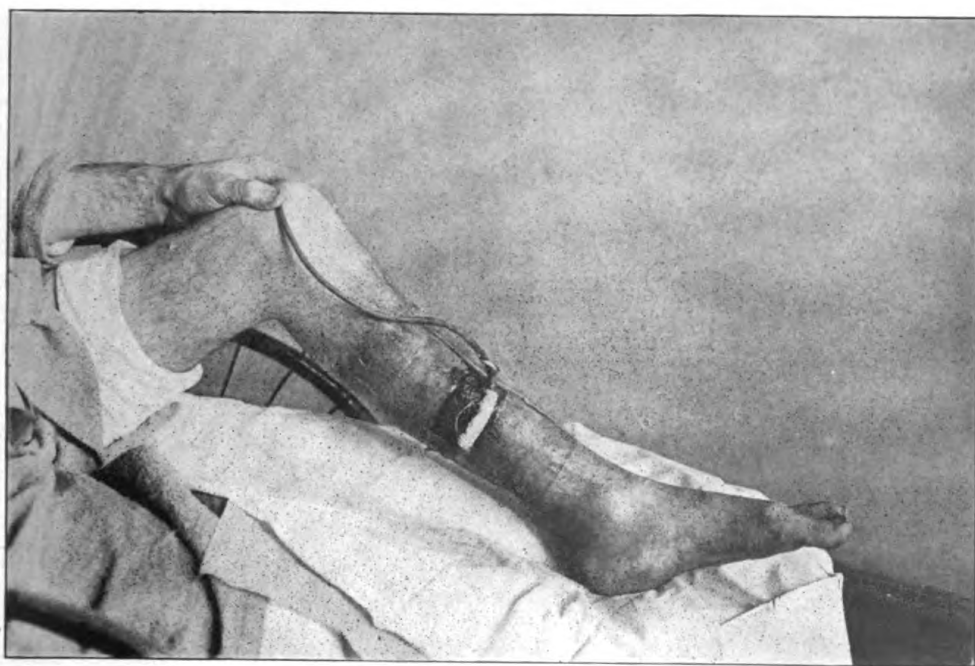


Fig. 9.—Case: G. J. A. Carrel tube and vaseline gauze in position.

556-1



Fig. 10.—Case: G. J. A. Uneventful healing after successful skin grafts.

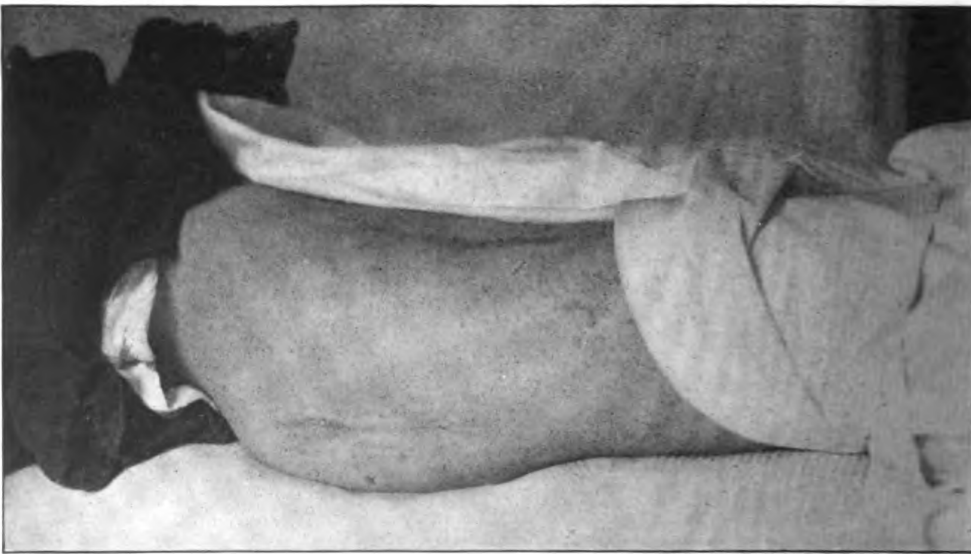


Fig. 11.—Case: C. C. R. Spontaneous closure after Dakinization of compound fracture of femur.

556-2

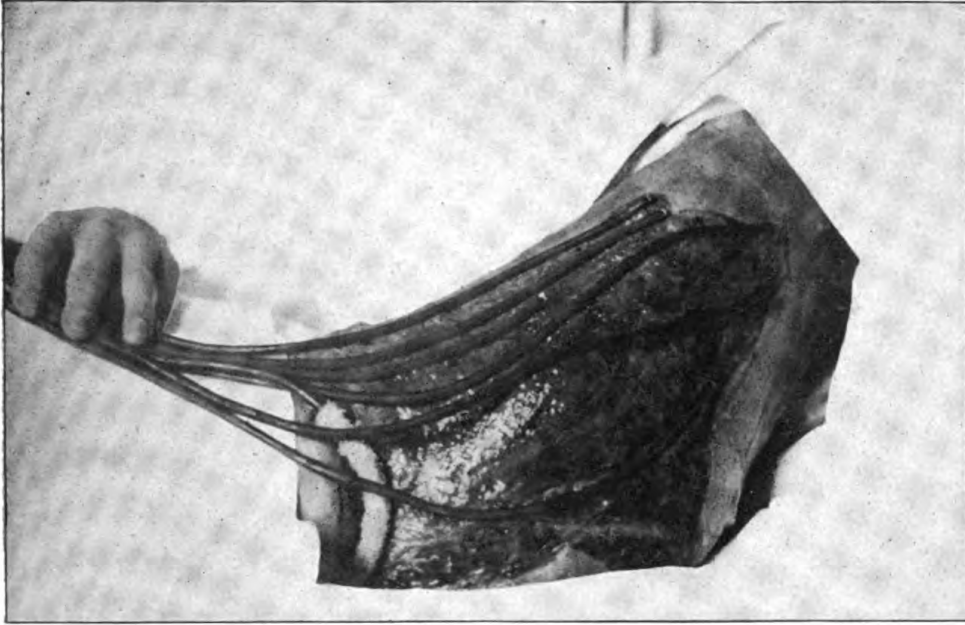


Fig. 12.—Case: R. A. K. To show the size of the wound and tubes in position.



Fig. 13.—Case: R. A. K. Clean wound ready for skin graft.

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Fig. 14.—Case: R. A. K. Growth of epithelium under Carrell Dakin treatment.

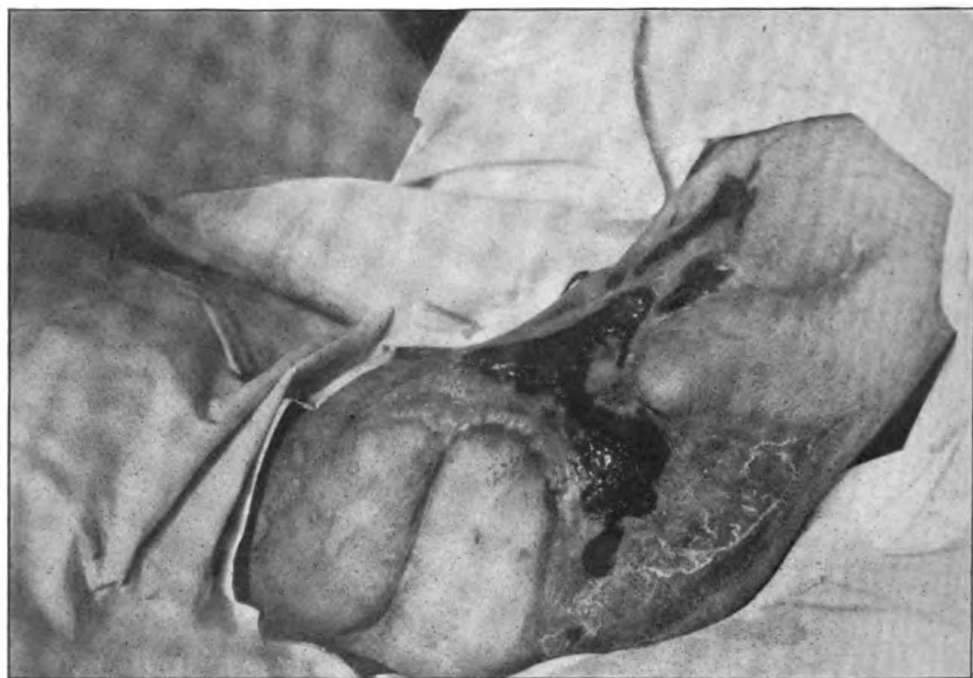


Fig. 15.—Case: R. A. K. Healing almost complete.

wound, were approximated and sutured in such a manner as to cover the trochanter and greater part of wound. (Fig. 14.) Within two weeks, however, the skin flaps retracted considerably and pus formed underneath. Carrel-Dakin treatment was again instituted and the wound allowed to granulate. On March 9, 1920, dakinization was discontinued. At this time epithelialization had taken place from all sides of the wound. (Fig. 15.) On May 7, 1920, when the patient's wound was almost entirely healed, he was discharged from our care, to be sent home to the British Admiralty.

This short series, comprising six bone cases, shows the definite indication at times for surgical intervention which no amount of dakinization can supplant. A part of our successful handling of these cases can be attributed to the constant surveillance of the senior surgeons and occasional visits and suggestions by Dr. Alexis Carrel and Dr. Ebling, his technician.

THE USE OF ETHER IN PERITONITIS.

The use of ether in the abdomen presents many interesting phenomena from an experimental and therapeutic standpoint. In connection with this discussion its use in a case of peritonitis due to acute suppurative appendicitis will be reported.

R. F. D. Age 18. Apprentice seaman. Was admitted to the United States Naval Hospital, New York, October 23, 1919, with the diagnosis of acute appendicitis.

Previous history.—Patient had scarlet fever at the age of 10, but does not remember the details. Otherwise previous history has no bearing on the present condition. Venereal history denied by name and symptoms.

Present condition.—About 12 hours before admission, following the eating of frankfurters, patient had general abdominal pain, which later became localized in the right lower quadrant of the abdomen. He vomited twice, felt nauseated, and his temperature was recorded as 101 F.; pulse, 106; white blood count, 14,400. On examination at the time of admission he had general abdominal rigidity and peritoneal irritation. The physical signs were more marked over the appendix area.

Operative procedure.—A gridiron incision was made. The appendix was found gangrenous and covered with a large amount of fibrinous exudate, which extended to the cecum. The base of the appendix was tied, its stump buried with a purse-string suture, and the two abscesses, one in the pelvis and the other in the right renal area, were opened by blunt dissection with gloved finger. A large amount of pus was mopped out and 8 ounces of ether poured into

the abdominal cavity. The excess of ether was mopped out and two drains were inserted, one extending into the pelvis and the other into the right renal region. The abdomen was closed in the usual manner and reinforced by silkworm gut sutures. Patient was returned to the ward, placed in the Fowler position, and given fluid by rectum in the usual manner. His temperature at this time was 102; pulse, 98; respiration, 18. The drainage diminished rapidly, and on October 27 one drain was removed. Four weeks later the drainage ceased and the wound was given an opportunity to close.

On November 22, 1919, the patient developed physical signs of consolidation of the right lower lobe. His temperature rose to 105 F, and his white blood cell count to 10,550. Three days later his temperature became normal and the patient made good progress.

On December 5, 1919, patient developed an otitis externa, which confined him to his bed a few days. These suppurative processes left him very weak, but with tonic treatment he should be ready for duty in a comparatively short time.

LITERATURE.

A few historical facts relating to the use of ether in peritonitis are surely of interest at this time. The first formula for ether, according to Berzelius, dates back to 1540, when it was published by Valerius Cordus, who called it *Oleum Vitrioli Dulce*. Frobenius was the first to call it ether.

Its first use as an anesthetic dates back to 1842, when C. T. Jackson records having used it on himself. It is interesting to note that C. T. Jackson was making some experiments with chlorine gas and accidentally broke the container. He had severe pain in his throat, soreness in his chest, and difficulty in breathing. He notes that he took a sponge, covered it with ether, and then sat down in a comfortable position with his feet elevated, and inhaled its fumes. He could feel himself going to sleep and at the same time had an amelioration of the distress in his throat and chest. He fell asleep, and on awaking found the sponge on his chest and the distressing manifestations slowly returned when he was completely out of the effects of the anesthetic. Its first use in surgery was by Warren in 1846 at the Massachusetts General Hospital.

Souligoux has used ether locally in connection with wounds since 1891; while Souligoux and Morestin of Paris report the use of ether in peritonitis since 1901. They report having used it in cases following suppurative salpingitis, following perforated gastric and duodenal ulcers, and suppurative appendicitis.

De Tarnowsky in 1914 reports a series of 30 cases of peritonitis in which he used as much as 1 liter of ether. He closed 27 cases without drainage and left 2 ounces in the peritoneal cavity.

Jeanneret, in 1914, reports a case of recovery following acute peritonitis from appendicitis in a child aged 7, and says that this can only be ascribed to ether lavage.

Bainbridge, in 1916, reports its successful use in a case of gangrenous appendicitis with peritonitis. Six ounces of ether were poured into the abdominal and pelvic cavity.

Saliba irrigated 248 abdomens and reports two cases in which there were distressing symptoms following its use. In one there was sudden shock and in the other pneumonia appeared after the fourth day, but he is not altogether satisfied that the ether was the causative factor. Both of these cases got well. In the first case the patient was 9 years old, and in the second 49 years old.

He describes the action of ether in liquid and gaseous form, inasmuch as body temperature is 2 C. above the boiling point of ether. Ether is rapidly evaporated and absorbed. It is first dissolved in the lymph of the tissue spaces and then passes into the circulation, later to the lungs, where it is rapidly eliminated in three to four minutes after it is introduced (Morton). Among his conclusions, Saliba holds that ether, experimentally and clinically, has proved to have a bactericidal action; in peritoneal infections it is a safe and beneficial antiseptic; its dosage is 1 ounce in children up to four years, and 3 ounces in adults. There are generally no untoward after effects. The toxic actions on various body organs are very slight. In another paper, Saliba feels that ether causes active hyperemia and calls forth antitoxins, antiferments, bacterioly-sins and bacteriotropins. Furthermore, by its tonic action on the circulation and the nervous systems, it may possibly have a stimulating influence on the hemapoietic organs. Leucocytic emigration goes on unaffected in the presence of ether. Ether produces no injurious effects on mucous membranes.

Other uses to which ether has been put are: (1) Superficial septic wounds. (2) Abscesses and sinuses. (3) Peritoneal infections. In connection with the latter cases he does not use it when there is a general peritonitis resulting from an intestinal obstruction, the peritonitis being due to the passage of bacteria through the intestinal wall. (4) Rouhier used ether in moderate strength in cleaning out abdominal wounds following injuries by projectiles. (5) In pleuritic infections the early irrigation with ether in full strength or diluted has been found useful. (6) Joint cavity infection. Murphy holds that every nontraumatic joint inflammation is a metastatic manifestation of a primary infection in some other part of the body.

Philip and Tartois also report favorable results following the use of ether in a series of 16 cases in children.

Waterhouse describes the use of ether in various kinds of wounds and infections, covering a period of over five years, with excellent results. Among the types of cases in which he used this remedy he mentions (1) abscesses, (2) compound fractures, (3) carbuncles, (4) tuberculous glands, (5) tuberculous synovitis of joints, (6) acute arthritis, and (7) septic gunshot wounds.

EXPERIMENTS.

Topley made extensive experiments with the use of ether in healthy peritoneal cavities and found that there was a clear effusion, which is seldom abundant. In this effusion during the first two hours endothelial cells predominate and the polynuclears are relatively scanty; later the polymorphonuclears increase rapidly at the expense of the endothelial cells and mononuclears. He also noted that no adhesions result from the injection of ether without manipulation. Ether injected into the healthy joints of animals is rapidly absorbed, and the change in the scant effusion is similar to that which occurs in the experiment using ether in the peritoneal cavity. After one week, joints which were originally injected with ether were found normal. Other joints into which ether was injected some minutes after their inoculation with bacteria, and which were opened 7 to 10 days later, were found normal, except that they contained minute amounts of white structureless caseous material. Without the injection of ether, a joint inoculated with the same bacterial culture and examined 7 to 10 days later was found markedly swollen and contained a large amount of pus.

Other experiments by Corbett, in connection with the formation of adhesions, showed that ether introduced into the peritoneal cavity produced no permanent adhesions. He was, however, unable to substantiate its use as an antiseptic.

Santy, in a series of experiments on rabbits, to determine the immediate and after effects of flushing out the peritoneum with ether, notes that the histological changes are a negligible quantity.

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HISTORICAL.

THE FOUNDERS OF NAVAL HYGIENE.

LIND, TROTTER, AND BLANE.

Then swore Lord Thomas Howard: "'Fore God I am no coward;
But I can not meet them here, for my ships are out of gear,
And the half my men are sick. I must fly, but follow quick;
We are six ships of the line; can we fight with fifty-three?"

(Tennyson, Ballad of the "Revenge.")

That "Britannia rules the waves" is more than an empty boast for perfervid patriots bursting into song. King Alfred modified the shape of ships, making them longer and narrower. King John, Richard III, and Henry VII had a lively appreciation of the importance of sea power. The latter founded a navy in the modern sense, and then the nation set to work soberly not to claim, but to acquire, control of the seas by lavish contributions of men and less liberal expenditure of funds through centuries of naval warfare.

Neither the sailors of Spain, France, nor Holland were lacking in courage, but the British, besides having bulldog tenacity, splendid seamanship, and well-considered strategy, used the policy of attack even when disparity of numbers, surprise, or other conditions might have argued for parry instead of thrust. As an index of this forward spirit the impartial writer should include in British naval history the deeds of the three surgeons who built up a science of naval hygiene, just as they attribute some of Nelson's success in command to his ever-present concern for the health of his men.

Lind, Trotter, and Blane were tireless leaders in a noble cause. They struggled against stupidity, ignorance, prejudice, and indifference in high places and low, the admiralty, and the forecabin; they had the hard task of seeking to break down immemorial custom; dared to challenge tradition; hammered at the walls of a hierarchy as soul chilling, as rigorous, as iron bound as any Brahmin caste; preached seemingly frivolous, beneficent novelties to insular conservatism that held hardship essential for hardihood.

There is little glory for the reformer on his *via dolorosa*, but these men had the resolution to bear up under the blows of opposition; there was that in their blood which healed the poisoned wounds of sneer and misrepresentation and nourished them through the wasting fever of disappointment. They were heroes. Blane, because he had tact and patience and the happy faculty of making a

pleasing impression, enjoyed the satisfaction of seeing realized many of the reforms he advocated. From the start he had influential friends, and he seems to have been *persona grata* with captains, admirals, and the like. Honors came to him from the start. Lind, the pioneer, a genius for observation and deduction, died too soon to reap the fruit of his labors, and had the vexation of seeing others win rewards to which he was entitled. Trotter was certainly their equal in ability. He was witty, satirical, often bitter, and he was outspoken and fearless, a combination ill calculated to win the acquiescence of military superiors. He writes convincingly to the reader of a later century; but one can readily understand why he must often have failed to get satisfactory cooperation and help from his contemporaries. All three were eminently practical men, to whom no detail of duty was negligible or unimportant, and all three were men of culture and erudition, furnishing a splendid refutation of the idea—entertained by too many young physicians in America and in our service—that great learning, especially of the classical type, militates against practical accomplishment.

JAMES LIND, the first and most original of these worthies, was, like the other two, a native of Scotland, which supplied many a surgeon to the early army and navy, and since the days of steam seems to breed an inexhaustible supply of marine engineers. He was born in 1716 and died in 1794. In 1731 he was apprenticed to a surgeon in Edinburgh. From 1739 to 1749 he cruised in the West Indies, the Mediterranean, and off the west coast of Africa as a surgeon in the royal navy. A year before leaving the service he got his M. D. from Edinburgh; a year after he was made a fellow of the Royal College of Physicians. For 10 years he lived and practiced in Edinburgh, and it was during this period that he published his two great works, "Treatise on Scurvy" (1754), subsequently translated into French, and the "Essay on Preserving the Health of Seamen in the Royal Navy" (1757), which was translated in due time into French, German, and Dutch. He was an honorary member of scientific societies in Paris and Copenhagen, but from his own people received scant recognition. He died just a year before the issue of antiscorbutic rations was made obligatory. The use of tenders for the reception and outfitting of recruits, as recommended by Lind, was not begun until 1781. They were known as "slop ships." Eleven years after his proposal to distill water aboard ship Irving, also a naval surgeon, received £5,000 from the House of Commons for devising an apparatus no better than that of Lind, who was actually put on the board to determine the propriety of the award.

In 1768 was first published an "Essay on Diseases of Europeans in Hot Climates," of which five editions were published in his life-

time. It was translated into French and German. Meanwhile (1758), Lind had been appointed physician to the Royal Naval Hospital, established only four years before at Haslar. This was a civilian appointment, and it was not until 1805 that an order in council made service afloat a prerequisite for the position. Lind remained at Haslar 25 years, and had the pleasure of seeing his son, who had first been assistant surgeon and then assistant physician under him, appointed as his successor.

While Lind is commonly accepted as the first writer on tropical diseases he was long antedated by one George Whetstone, an Elizabethan traveler and gallant, to whom archdeacon Richard Hackliewit, of Westminster, refers in a volume of "Voyages, Navigations, Traffiques, and Discoveries of the English Nation" (1600), stating that he had shown the work to Dr. Gilbert, Queen Elizabeth's physician, by whom it was pronounced imperfect and defective. Whatever its imperfections and defects Whetstone's treatise, "The Curing of hot Disease incident to travellers in long and Southern Voyages," robs Lind of the title of first writer on tropical diseases. In his discussion of tropical diseases Lind has much to say about marshes and swamps in relation to fever. A hospital for sick seamen erected in Jamaica was so commodious, useful, and grand that it was called Greenwich, after the establishment on the Thames. Unfortunately it was "near a marsh upon a most unhealthy spot of ground." Patients sent thither acquired fevers (malarial and yellow fever), and the mortality was high even when there was no overcrowding or general contagion. The site had to be abandoned. Our author makes interesting comments on the climate of Mobile and Pensacola and their prevalent fevers, for which Peruvian "bark has been found a sovereign remedy." The contrast between ships anchored well out and residences ashore is illustrated by the good health of the crews of the *Tartar* and *Prince Edward* and that of a British regiment which came to Pensacola in 1765 and promptly lost 120 men, while 11 out of 12 officers' wives died. The remarks on climate and conduct are pertinent and discriminating. Excess or imprudence in eating, indiscretions of any kind, lack of cleanliness, proper exercise, and fresh air count as much as heat and tropical surroundings. The sick can always be moved with safety to a place where they will have more favorable conditions for recovery—nay, they will benefit by the change. He held that for tropical ports a sort of floating hospital is better than a building ashore. Many and well authenticated are the citations to prove that sleeping ashore at night in certain localities brings on dangerous and fatal fevers. There were eight gentlemen who went one midsummer to a certain section of Florida to solicit votes for a candidate for the general assembly of the province, and

after a single night's exposure all contracted a violent intermittent fever and two of them died, one being the aspirant himself.

The chapter on dysentery and cholera morbus reveals Lind as a careful prescriber and conscientious nurse whom patients could not fail to trust. He was a believer in disinfection, and held that it was better to have the cooking on the berth deck where the men lay, as the smoke then diffused itself among them, pervaded the ship, and prevented infection. The *Edgar*, of 60 guns, while off the coast of Guinea in 1765, had many deaths aboard. A vessel in company with her had few sick and no dead owing to the galleys being located as suggested.

Bark as a prophylactic is urged by Lind, instancing the success that attended the distribution of large quantities of it by the African Company to the employees in its factory, on the coast of Guinea, for use during the rainy and sickly season. The results were excellent, provided the employees could also be persuaded to eat far less meat than they were accustomed to in England.

Lind opposed the common practice of repeatedly bleeding people in the Tropics, on the theory that it caused a renovation of the system. He thought it only weakened them.

Lind's work in connection with scurvy is a model of painstaking scholarly research. He reviews the subject from the most ancient times, adverts to the possibility of its having been known to Hippocrates, quotes Dr. Poupert's opinion that the scurvy he saw in Paris was like the Athenian plague, affirms that the first authentic account of scurvy is that of the Sieur de Joinville in his history of Louis IX. (Scurvy attacked his crusaders in Egypt, 1260.)

Scurvy was for centuries the scourge of life at sea, and almost equally fatal in prisons and in military operations ashore, especially sieges. Vasco de Gama, Jacques Cartier, Lord Anson, all voyagers and discoverers, in fact, had their undertakings as well as their lives jeopardized by a stay of a few weeks at sea. Sir Richard Hawkins, in the course of 20 years, knew 10,000 men to die of scurvy. Lord Anson, in circumnavigating the globe (1740-1744), arrived at the island of Juan Fernandez with but 214 survivors out of a crew of 506 men on his flagship *Centurion*, and the *Gloucester* had but 82 left out of the original 374. His total loss on the whole voyage amounted to four-fifths of the personnel. From Quebec to Holland, from France to Russia and Hungary, the disease prevailed in troops, even when in hospital. Lind himself saw 350 cases of scurvy in a single voyage of 10 weeks. The channel fleet, in a 10 weeks' voyage, had 2,400 cases. We shall see later, in speaking of Blane, how the affection persisted, even after the proper remedies were well known, owing to the carelessness and indifference of the Government.

Beginning with the latter part of the sixteenth century books on the subject became increasingly numerous. Before discussing the subject himself Lind reviews them methodically, giving date of publication, title, and a few facts about the authors. Thus, Baldwin Ronsseus (1564) recommended spirits, fresh herbs, and wormwood, advising against pork and fat meats. J. Wierus (1567) prescribed cinnamon, sugar, watercress, scurvy grass, whey, milk, warm food, cheerful lodgings, and freedom from care. Solomon Albert (1593) mentions acid fruits, such as oranges, and barley gruels and exercise. Peter Forest (1595) boiled the juices of scurvy grass and brooklime with sugar, making an antiscorbutic sirup called after him and highly esteemed in the low countries. Felix Plater, writing in 1608, recommended oranges. Thomas Willis discussed the subject in 1667. In 1674 Francis de le Bœe, the famous Leyden professor and the reviver of clinical medical instruction, mentioned oranges for scurvy. Dr. William Cockburn, in 1696, wrote "Sea Diseases, or a Treatise of Their Nature Causes and Cure." When Lord Berkeley commanded the fleet at Torbay, in 1695, this author prevailed on his lordship to put the sick in tents ashore. More than a hundred cases, deemed almost too ill to be removed, were established in them and put on fresh provisions, with carrots, turnips, and other greens. Marked improvement was visible in a week and all got well. In 1747 Dr. John Huxham had recommended that the 1,200 scorbutics of Admiral Martin's fleet be given a vegetable diet. Charles Bisset, in 1755, wrote a "Treatise on Scurvy, designed chiefly for the use of the British Navy." Dr. Poissonnier Deperrières (1767) wrote "Traité des Maladies des Gens de mer." Edward Ives, on his voyages to India, filled half a hogshead with orange and lemon juice and one-sixth part of rum. The mixture would keep for two years. Ives was on the *Kent*, 64 guns, in Admiral Watson's squadron, and did not lose a man. Between 1541 and 1769 upward of 80 books or papers on scurvy were published in Europe.

Lind's treatment (we see from the foregoing that he was the apostle but not the originator of the orange and lemon idea) included general hygienic measures, such as fresh air, cleanliness, exercise, tonics of bark and iron. His specific remedies were dandelion, ripe fruits (particularly plums and apples), and lime or lemon juice in Malaga wine or with barley water, combined with acid gargles and mouth washes. He gives opinions based on a host of authorities and his own judicious observations and experiments. His service in the navy afforded him unsurpassed material for the first edition of his treatise on scurvy, and in later ones he could quote what he had learned at Haslar, where he sometimes saw as many as 300 or 400 scorbutics in a day. He noted that the disease was the same in every age and country.

It was on May 20, 1870, while at sea on the *Salisbury*, that Lind began the experiment which convinced him as to what was the best treatment to pursue. He selected 12 patients, all having approximately the same symptoms of scurvy, and all quartered in a "proper apartment for the sick in the fore hold." The diet was the same for all—viz, for breakfast, water gruel sweetened with sugar; for dinner, fresh mutton broth or light puddings or boiled biscuit with sugar; for supper, barley and raisins, rice and currants, sago and wine.

Two men received 1 quart of cider daily.

Two men received 25 drops of elixir of vitriol t. i. d. on an empty stomach, and used a gargle for their mouths.

Two men received 2 spoonfuls of vinegar, t. i. d. on an empty stomach, and used a gargle for their mouths.

Two men received one-half pint of sea water t. i. d.

Two men received t. i. d. an electuary of garlic, mustard seed, horse-radish, gum myrrh, and balsam of Peru; barley water and tamarinds to drink, with cream of tartar.

Two men received two oranges and one lemon daily (but these lasted for only six days.)

The patients receiving the oranges and lemons improved the most, and with astonishing rapidity. Those taking cider came next. The elixir of vitriol was valuable only for local treatment.

Lind claimed that he was the first person to recognize the feasibility of obtaining fresh from salt water at sea by distillation alone, and showed how easily this could be done aboard ship by utilizing, if necessary, the big coppers in which the men's food was cooked. He gave specific directions by which eight men in distress for lack of drinking water could procure themselves a pint apiece every three hours if possessed of a 5½-gallon kettle, a tea kettle, a cask, a musket, and the means of lighting a fire. He gives 1761 as the date of his discovery, thus by 10 years antedating Irving, who was rewarded by Parliament. Dr. Poissonnier did not publish his suggestion till 1764. Francis Bacon, Lord Verulam, in his "Natural History," speaks of the knowledge common to the ancients that salt water boiled and cooled again is more potable than if itself raw. He ascribed this to some of the salt rising to the surface as a scum and the rest going to the bottom as a sediment, "and so is rather a separation than evaporation." Sir Richard Hawkins made use of distillation to purify sea water, and tells of having on one of his voyages produced a hogshead of water, "wholesome and nourishing"; but it was generally accepted that he had added wood ashes to the water; and various substances were used by others, notably one Captain Chapman, who wrote to Dr. Fothergill in 1759 that he had added both soap and wood ashes. In 1739 Stephen Hales, an English clergyman, proposed distillation of fresh water from sea water after

first making it undergo putrefaction. In 1753 Mr. Joshua Appleby, a chemist of Durham, used calcined bones and lapis infernalis or silver nitrate to assist the operation, and the admiralty published the details of the process in the London Gazette of January 22, 1754, for the information of the service.

In 1768 the ship of war *Dolphin*, in her second voyage around the world, on the run between Batavia and the Cape, procured 42 gallons of fresh water from 56 gallons of sea water in 5 hours 13 minutes, at an expense of 9 pounds of wood and 69 pounds of coal, so that each man on board got a quart.

It is impossible to read his "Essay on the most effective means of preserving the health of seamen in the Royal Navy" without conceiving the most profound admiration for the author's discernment and good sense. To appreciate his reserve and moderation one must acquire from other books an adequate picture of the life and practices on a man-of-war in the first half of the eighteenth century. This is vividly depicted by John Masefield in his charming *Sea Life in Nelson's Time*, which prepares one for Trotter's constant ferment and ebullition over things as he found them.

One feels in running through the writings of Lind, Trotter, and Blane that Lind was almost overwhelmed by the situation confronting him. He sees remedies and urges improvements, but he lived in surroundings that had scarcely bettered, hygienically speaking, since the days of the Tudors. Trotter, a man of very different temperament, witnessed minor reforms, and was like a combatant who at the critical moment senses the possibility of success and the necessity of immediate and supreme exertions. Blane, imperturbable, calm, reassured by the evidence of distinct progress, personally favored by fortune, takes a cheerful view and avoids altercation. But he writes well, writes nobly, has the philosophic spirit, an eminently rational viewpoint. We can believe that his success was not all the result of useful introductions to influential people, affable manners, and a guarded tongue. He had talent and poise and fully deserved his conspicuous success. Both Trotter and Blane pay homage to Lind. Trotter, though frankly disagreeing with him in many particulars, especially as regards fumigations, is outspoken in his praise and calls him the "father of nautical medicine;" and many of his general hygienic suggestions are but an elaboration of those made by Lind, who blazed the way for all that has been done subsequent to his day in the British Navy and in ours.

While Lind was a believer in drugs and Trotter distinctly iconoclastic and skeptical, the former also grasped in a masterly manner the importance of regimen and of general and specific measures for the preservation of health. He speaks of "the preposterous custom

of washing the decks after sunset," when, of course, they must remain wet throughout the night, and washing down was the fatal hobby of British commanders. In wet weather decks should be swept and scraped, not washed, and fires should be lit to dry them out. We can imagine how willing captains were to flood the living spaces with streams of water, but to have fires in braziers disposed about the decks and to lower hot coals into holds was a bother and, of course, a menace to the safety of wooden vessels carrying ammunition.

We are still struggling feebly with the problem of moisture, largely reduced now by our heating system and electric blowers, but what must it have been in the days of wooden ships, whose massive timbers underwent prolonged "pickling" to prevent rot (the process really favored it immensely), while certain portions were steeped and boiled to permit their being curved according to the builder's design. These vessels when launched were actually water-soaked and moldy, and decay from moisture proceeded so rapidly that a man-of-war rarely lasted more than seven or eight years unless completely overhauled and repaired at prodigious expense. Ships were rotten from the start, and sometimes decay was fully manifest even in a year or two. Lind must have had all this in mind when he declared that the dampness of ships' timbers, a great cause of sickness, ought to be attended to when a ship was being constructed. But British naval architecture was a hidebound art, its products in every way inferior to the French ships, which sailed and handled better and would have vanquished their rivals had the gunnery and personnel been on a par with design and workmanship. With such a start we have only to add constant flushing of decks, always awash from leaky gun ports when underweigh, unpumped bilges, reeking holds, and between-deck spaces congested with dirty, sweating, ill-fed sailors, collected from still more ill-favored merchant ships, from jails, and city slums (the navy took any and everybody, refusing nothing), to produce an indescribable, almost unthinkable situation. No wonder that Lind pronounced Dr. Stephen Hales's ventilation (a system of air pumps and windmills elaborated in 1753) "the most beneficial invention for mariners which this age has produced."

"Nothing, I fear, has contributed more to the great sickness of late in our fleet than too strict attachment to old regulations and customs," says Lind, with a moderation utterly beyond Trotter, and yet not savoring of the urbane diplomacy of Blane. But he makes bold to assert that the rank of the captain and the character of the ship (size and number of guns, etc.) are not the principal things to be thought of in preparing for important and distant service. This was splendidly illustrated by the voyages of Cook and Anson. The former exercised admirable foresight in the matter of personnel, equipment, and stores; the latter put to sea with a crew of convales-

cents and Chelsea pensioners. The essential is a seasoned crew and attention to cleanliness, exercise, food, and ventilation. Lind has much to say about diet, and urges fresh provisions and fresh bread. "Fermented Bread too, from its being sooner subdued, and assimilated into Nourishment by the weakened digestive Powers, as well as on account of the Inability of Scorbutics to chew a harder Substance, might be very advantageously allowed the Sick. Nor could the Quantity consumed by them, though daily made aboard, be any Inconvenience to the necessary Oeconomy and Business of the Ship." The ship's biscuit was not popular. It was made in round pieces, with a hole in the middle, weighed 4 ounces, and was composed of mixed wheat and pea flour, the latter usually working itself into lumps too hard to be bitten through until age and dampness had come to the rescue. Sailors constantly threw their biscuit away, which may account for the expression "as far as you could toss a biscuit" to measure distance! Lind wrote an essay on feeding, and was eager to find a concentrated and nutritious substance available for the sick. He recommended using 1 ounce of powdered salep (the flour made from grinding certain orchidaceous tubers), 1 ounce of portable soup, and 2 quarts of boiling water, which yielded a palatable jelly sufficient to sustain a man for a day.

He calls attention to the allowance for the sick in French men-of-war: "They carry out fowls of all sorts, bullocks, sheep, kids, eggs, etc., which are distributed to the patients according to the direction of the surgeon." In the British service such things were for the officers only, begged of them or voluntarily contributed when some crisis made the need of delicacies peculiarly conspicuous. In Nelson's time and before, live stock was carried on many men-of-war, the pens for sheep and cattle being located in the waist of the ships on the main deck of first raters, or the upper deck of second and third raters under the boom of the foremast, forward of the wardroom. Nautical history abounds with references to the generosity of the British officers toward the sick and wounded, but Lind and his followers wanted systematic provision by Government substituted for individual philanthropy and chance charity. Lind urged the carrying of greens, pot herbs, and vegetables, and tells in detail how they can be preserved for a reasonable time and how successful he was along this line.

First, he takes up the prevention of the breeding of sickness and then discusses how its spread may be checked. Our own "health record" is foreshadowed in Lind's insistence on careful scrutiny of the recruit. "In the usual descriptions of impressed men taken by the regulating captains it would be proper to insert their former way of life, the place of their late residence, their present state of health, and with regard to sailors [as compared to landsmen] the length and

healthfulness of their last voyage." He realized the susceptibility of untrained men to disease, and indeed it must have required far more seasoning to accustom the landsman to the hard life of the sea in those days than now. As to landsmen, our three worthies all recognized that they were the surest victims of contagion and the great menace to the health of personnel. Lind speaks of the guard ship as often a perfect "seminary of infection to the whole fleet. I have known a thousand men confined together in one guard ship, some hundreds of whom had neither a bed nor so much as a change of linen. I have seen many of these brought into Haslar Hospital in the same clothes and shirts they had on when pressed several months before."

Our detention and isolation methods in 1917 and 1918 would have been in operation from the creation of our Navy if our medical officers, like our predecessors in the parent establishment, had not been always hampered and circumvented by so-called "military necessity," which, as often used, becomes the most outrageously superficial, self-contradictory phrase in the vocabulary of authority. Lind recommended a tender in the river for the detention of "the most ragged and suspicious persons, whether pressed at sea or on shore," for at least 14 days, when "Their old Cloaths might be destroyed and new ones given them and their Persons well purified and cleaned."

On the guard ship, fully as much as in the cruising vessel, cleanliness was the great essential. The men ought to be sent on deck with their hammocks every morning, while below all gun and air ports were opened up. At least once a month their hammocks ought to be scrubbed. He condemns the universal practice of overcrowding (a word most familiar to one who has had to read our sanitary reports for three years past). The reader will realize what the overcrowding of those days was when he recalls that a ship of 2,000 to 2,600 tons, 180 feet long at the lower gun deck level, carried from 800 to 950 men. Third raters of 1,300 to 2,000 tons and 160 feet long carried from 500 to 700 men. It took eight men to handle each one of the 40 to 75 guns and four to each carronade, and an excess of men was needed on long voyages as a *military necessity* for anticipated loss from the mortality due to disease. The overcrowding provided for the mortality in more senses than one!

Lind was a great believer in the value of exercise as a preventive of disease, and urged cold baths to increase vigor and resistance. Another preventive measure recommended is a supply of cinchona (our three writers call it bark) to ships going to fever-infested localities. Two doses daily are advised, particularly for sentries, working parties, and others on duty ashore.

Allusion has already been made to distillation. Lind told how to make filters, emphasizing the necessity of frequently changing the

sand, etc., and described minutely the familiar double-barrel arrangement.

For preventing the spread of infection, fresh air and avoidance of overcrowding are essential. The location of the sick berth is discussed at length. For infectious cases the forecastle was preferable to holds and gun decks, as they would be away from the rest of the ship's company. In the forecastle canvas and boards were to be used to shelter the sick from rain and wind. If the number of infectious cases or the requirements of working the ship made the forecastle unsuitable, then they were to be installed in the gun room, even at the cost of some inconvenience to the officers who ate and slept there. The gun ports were to be kept open, and there was no real danger to the denizens of that compartment if it was kept sweet and clean. It was an accessible locality, readily cleaned up when the emergency was passed. In case permission to use the gun room was refused, the usual sick berth would be utilized; but then air holes or scuttles must be cut in each side and ventilator pipes installed for use when the weather forbade opening the scuttles. The directions to keep the sick quarters of contagious cases "free from all Incumbrances of Chests and the like; as also from Crowds of People" sounds very modern, and likewise the insistence on careful daily cleansing of all utensils, buckets, etc. We are only beginning to discard the fumigations which Lind esteemed so vital. He used vinegar, burning tar, pitch, niter, and gunpowder (for the sulphur). The clothes of the patients are to be washed and fumigated. Their linen is to be changed frequently when they sweat excessively. As soon as a bed is vacated it must be sunned, aired, fumigated, and then beat by the sick man's messmates. The sick must be set at a convenient distance from each other and not crowded, and the infected must be separated from the noninfected. The surgeons visiting a contagious case must wear "a Suite of Cloaths reserved for the purpose," linen garments, "especially waxed ones," being superior to woolen ones. Nurses and attendants on such cases should wear painted canvas jackets that can be easily washed off. After removal of the sick and their effects (as on transfer to hospital), all bulkheads are to be washed, using a good stream from a pump, so that cracks and crevices will be mechanically freed of all accretions. Then everything is to be closed up and sulphur (gunpowder) in saucers (surrounded by water) of live coals burned for two hours. The supply nearest the passage of exit is the last to be lit. After two hours everything is opened up, and by springs on the cables the hawse holes are brought into the wind so as to get a good current of air pouring through the ship.

There is need of a recovery place or berth for convalescents, but they should not be admitted to it until they have been bathed and outfitted afresh and their clothes and bedding disinfected. Finally,

thought should be given to the influence of depressing emotions and the importance of keeping up the spirits of the infected. Remove the dead quietly and privately to a convenient place. Have persons of cheerful dispositions in attendance on patients. Furnish them amusement. Indeed, officers of the ship should enjoin and promote amusement for all sick persons.¹

The greatest caution must be observed in receiving men from other ships, and when patients are transferred to a hospital the captain or surgeon should acquaint the hospital officials with the nature of their diseases previous to landing them, so they may be assigned to proper and distinct wards; otherwise they may not be distributed as their cases demand, and simply be sent to wards where there are vacant beds, without information until the surgeon receives the hospital tickets. Hospitals should have separate wards for different types of disease.

In time of war officers in guard ships must be particularly careful about the cleanliness of the ship. "Raw sailors and unseasoned marines are often the occasion of great sickness in fleets." Lind made a strong appeal for a uniform style of dress and regular issue to the recruit. This would permit the discarding or destruction of dirty and infected clothing and contribute in many ways to health and morale. (Suggested in 1774 and adopted in 1857.) Until the middle of the nineteenth century the British tar dressed pretty much as he pleased. Up to and after Nelson any filthy rag would serve as covering when he was at work aboard ship, but for liberty and parade he was very particular about his appearance, and individual taste was unrestricted. A cue was commonly worn in imitation of the marines or, perhaps, of the French sailors, but many affected curls falling to shoulders. A jacket of blue was fairly universal, and it was always bedecked with buttons and ribbons. The sailor delighted in rings, chains, earrings, charms, and furbelows of little value, bought at a fancy price from Jewish tradesmen and the bum-boatmen that fed on Jack's purse in port. Trousers were wide and full, usually white, but old engravings and colored prints show that a fondness for striped trousers was quite general. Some men wore knee breeches and stockings, the latter, of course, of silk; and the low-quarter shoes had silver buckles. The greatest diversity prevailed, too, in the costume of officers. Their blue coat and white trousers are said to have been imposed by George II, who had conceived a great admiration for a certain dress, in which these colors prevailed, worn by the Duchess of Bedford. According to one authority, surgeons did not wear a distinctly naval dress until 1805. Uniform apparel for officers was not general before 1825.

¹ It was Lord Nelson who introduced ship theatricals.

Lind was plodding, painstaking, methodical, precise. His directions are clear, concise, and minute. "If any should think that the many Precautions I have mentioned are trifling, it is for fear they may be thought so, that they are so particularly inculcated." He credits to every source the ideas not original with himself and shows a wide acquaintance with everything written on the subjects he discusses and that he is fully abreast of the latest devices and practices ashore. He must have been careful in little things to be able to carry unbroken for 14 years a single Fahrenheit thermometer, taking temperature observations everywhere. There is feeling and candor, but no visible acrimony, and not a word too much in his claims to priority or originality in various schemes, and in his comments on the rewards that went to less deserving people who had better opportunities to attract the favorable notice of parliaments, councils, and committees.

In discussing asphyxiation he gives a brief suggestion for artificial respiration: "meanwhile another Person by a gentle alternate Pressure and Dilatation of the Ribs with a corresponding alternate compression of the contents of the Belly upwards imitates as near as possible the Act of Respiration in a living Body." The bulk of the treatment of the apparently drowned relates to drying and warming the body, etc., and the practice, so popular in the eighteenth century, of using rectal insufflations of tobacco smoke is not forgotten. In discussing the danger of being struck by lightning and the treatment he hazards the guess that "Experience may evince the Utility of having proper Conductors fixed at the Masthead or in the Shrouds. Meanwhile it is advisable for the Preservation of the Men who are exposed to it upon Deck, that, during violent Thunder and Lightning, the Officer take the first Opportunity of a heavy Rain falling, to employ them in some Ship-duty, with a View that their Cloaths may become wet. If this cannot be complied with, let some Artifice be fallen upon, that at least the Hats of all the Men in the Watch be dipped in Water. This may be effected in way of Play, or Diversion, among the People, without their knowing the Reason of it."

THOMAS TROTTER was born at Melrose, Scotland, in 1760 or 1761; went to school at Kelso; studied medicine at Edinburgh; and was appointed surgeon's mate to the *Berwick* in 1779. The following year found him cruising in the West Indies, and he acquired a practical knowledge of the Tropics by coming down with fever and losing all his medical stores in a hurricane. He was present during the naval engagement off Dogger Bank in 1781, and by his attention to the wounded earned the public thanks of Commodore Stewart. Promotion to surgeon came in 1782 but, a year later, following the cessation of hostilities, there was a great reduction of navy personnel, and Trotter found himself unemployed. Only 120 out of 750 surgeons

were granted a small half pay, so he went to sea on the *Brooks*, out of Liverpool, a slaver in the West African trade. No attention was paid to his advice that the owners lay in a good supply of fresh vegetables, and the crew and cargo suffered severely from scurvy. Forty slaves died on the run to Jamaica, but the survivors brought enough to make the expedition profitable. Trotter himself was ill from fever, and on getting back to England he left the slaver, thoroughly disgusted with all he had seen and experienced. Trotter now spent five years ashore, writing, studying, and practicing his profession, and received his M. D. from Edinburgh, the subject of his thesis being "Concerning Drunkenness."

In 1789 he was appointed medical officer to the *Barfleur*, Admiral Roddam's flagship. Later he was a year at Haslar Hospital, and in 1794 was chosen fleet physician to the channel fleet under Lord Howe. In 1795 he was rendered unfit for sea service, due to a rupture contracted in going up the ship's side on a professional visit to a wounded officer, and his retirement followed in 1802. After 25 years of private practice in Newcastle, Trotter went to Edinburgh and to Roxburgshire, and finally returned to Newcastle, where he died in 1832. Trotter was a voluminous writer and did not restrict himself entirely to professional subjects, being the author of verses, a tragedy in five acts, etc. His life was one of ceaseless activity, and his outspoken conduct of a long campaign for reforms in the naval service inevitably procured him enemies. With his service colleagues he was popular, as he agitated for betterment of their condition in the matter of rank and pay, consulted them, quoted their opinions, and spoke in praise of their work. He urged Government recognition of Jenner, whom he greatly admired. In 1797, 15 surgeons in the fleet at the Cape of Good Hope joined in presenting him with a gold snuffbox "in gratitude for long and unwearied exertions" on their behalf; and in 1802 he received an urn bearing a suitable inscription, a pledge of the affection and respect of 60 medical officers regretful of his retirement from active service. Toward Blane, his superior in rank, Trotter appears to have entertained some animosity, not surprising in view of certain circumstances. Blane had begun his career at sea in a civilian capacity, been made physician to a fleet without holding any preliminary subordinate positions, and was made a commissioner on the Board for Sick and Wounded Seamen 21 years after retirement from the Navy. Trotter praises Lind in the highest terms, but disagreed with some of his teachings, and said so in unvarnished language.

Trotter's style is vigorous and pointed, but lacks the elegance and simple charm of Blane's writings. He abounds in quotations from classic authors, from Virgil to Shakespeare, and freely cites his contemporaries, including the physicians of America, among

whom was Benjamin Rush, whom he calls the American Sydenham and greatly venerates.

His most valued works are: "A Review of the Medical Department of the British Navy with a Method of Relief Proposed" (1790); "Remarks on Naval Hospitals and Sick Quarters, with Hints for their Improvement" (1795); "The Practicable Plan for Manning the Royal Navy and Preserving Our Maritime Supremacy without Impressment" (1819), which gives, incidentally, a description of one of the several mutinies of this period arising out of need for better food and pay; "Medicina Nautica" (1791-1803).

The "Medicina Nautica" is of extreme interest, partly because it portrays the author as no other man could do it with pen or pencil. Like Lind and Blane, he cites a multitude of cases from his own experience and that of others, but, unlike them, he makes no scruple to say what he thinks, whether supported by the authorities or running counter to those of his time. He was a fearless critic of government and admiralty. He did not believe in disinfecting ships with vinegar or nitrous acid or any chemical for every infection that came along, and scorned to do anything as a mere placebo or for the impression it would make on the ignorant. He classes the "vinegar of the four thieves" with charms and amulets, and puts his faith in fresh air; scrupulous cleanliness; sunlight; scalding water for fomites and for bulkheads, which should be whitewashed too; prompt changes of linen and bedding; dry decks; well-ventilated decks and wards; prompt isolation and quarantine. Mattresses on shipboard ought to be covered with leather or painted canvas, so that they would not be absorptive and damp, but readily cleaned. Patients and others should be kept warm and well nourished.

The way to remove contagion from a ship is to take away the infected patient. There should be fires on the decks to overcome dampness. Overexertion and intemperance are to be avoided. Patients should be amused and the spirits of the personnel kept up. He urges supplying ships with bands and encouraging the men to dance in the evening. He himself acknowledged a passionate fondness for both music and dancing. He resents the fact that a regiment of soldiers has a band, a ship's company none; indeed, his writings give frequent evidences of a sort of envy of the sister service. Hospitals and ships should have a system of ventilation. Burning vinegar and niter only gives a false sense of confidence and makes people forget the simpler but more important details, light, air, and soap. He repeatedly urged that soap be issued to the men, and suggests following the example of the Portuguese, who used a good salt-water soap. His general directions for the routine at Haslar could scarcely be improved on,

and he was ambitious for the institution; wanted a good medical library there for use of doctors on visiting ships, as well as for the staff; gardens and orchards; a suitable installation for hydrotherapy. "How grateful is a Dish of Sallad after a long Cruize? How delicious an Apple, a Pear or a Plumb, after a long Sickness on Board?" He says of bathing: "Tubs were employed for this purpose while I belonged to Haslar in the form of those used in slop ships for purifying new-raised men, but the seamen had such a dislike to them that it was found impracticable to get a rheumatic patient to bathe because they reminded them of scrubbing, by way of punishment, on board. Instruments of this kind degrade a public charity; a sailor under disease ought to be bathed like a gentleman."

His analysis of the sailor deserves to be quoted in full, but space forbids: "A Fullbred seaman is seldom a profligate character; his vices, if he has any, rarely partake of premediated villany or turpitude of conduct but rather originate from want of reflection and a narrow understanding. Hence he plays the rogue with an awkward grace, though the degree of cunning which he occasionally practices towards his creditors bespeaks art; but from them he has learned the way to over-reach; and it ought to be remembered that they have a particular interest in emptying his pocket as quickly as possible; for his bargains with the world are limited to his landlord and slop-seller. . . . he acquires no experience from past misfortunes and is heedless of futurity. His conversation commonly turns upon his own profession and his animadversions are almost confined to a ship, her various properties such as sailing, rigging, etc. yet the sailor has a wit of his own and he translates all occurrences into his own phrase: *Conns* a horse when he rides; *heaves the lead* from the top of a stage coach.

"Their pride consists in being reputed a thorough bred seaman, and they look upon all landmen, as beings of inferior order. This is marked in a singular manner, by applying the language of seaman-ship to every transaction of life, and sometimes with a pedantic ostentation. Having little intercourse with the world, they are easily defrauded, and dupes to the deceitful, wherever they go; their money is lavished with the most thoughtless profusion; fine cloathes for his girl, a silver watch, and silver buckles for himself, are often the sole return for years of labour and hardship. When his officer happens to refuse him leave to go on shore, his purse is, sometimes, with the coldest indifference consigned to the deep, that it may no longer remind him of pleasures he cannot command."

Impressment has a bad effect on his character, making him sullen, and he is always eager to escape: "It is also the source of numerous deceptions by making him assume diseases to be an object of invaliding. Hence he employs caustics to produce ulcers, inflates the

urethra to give the scrotum the appearance of hernia; and drinks a decoction of tobacco to bring on emaciation, sickness at stomach and quick pulse." But Trotter appreciates the tar's many good features. Of his generosity he says: "His bounty is not prefaced by a common, though affected harangue, of assuring his friend that he will divide with him his last guinea: he gives the whole; requires no security, and cheerfully returns to a laborious and hazardous employment for his own support. Was I ever to be reduced to the utmost poverty, I would shun the cold threshold of fashionable charity, to beg among seamen; where my afflictions would never be insulted, by being asked, through what follies or misfortunes I had been reduced to penury."

On the cherished British institution *impressment* our brave author remarks: "A country, that boasts so justly of her *civil rights*, ought long ago to have rescued from an involuntary engagement, a description of people, to whom she owes her greatness in the *scale* of empire. I am afraid that men high in office, have a very limited idea of the afflictions occasioned by impressing seamen. Instead of calling it, a necessary and politic measure, for the safety of the country, I pronounce it to be a most fatal and impolitic practice. It is the cause of more destruction to the health and lives of our seamen, than all other causes put together; and every nerve of invention ought to be strained, to put a speedy and effectual check to it." The system of "requisitioning or draughting seamen and landsmen for the Navy" temporarily put into effect by an Act of Parliament under Pitt in 1795 worked admirably and Trotter thinks the liberal bounties paid were a good investment.

"In the beginning of a war, if we suppose the peace establishment to be twenty thousand men; sixty thousand more may be raised by requisition, in the like manner, and in the space of four months; by which means, seventy sail of the line, with a proportion of smaller vessels, would be ready to strike a blow before any enemy could be prepared to face us.

"The evils of impressing are manifold: a great number of our best seamen immediately disappear at the beginning of a war, and conceal themselves. It requires some time to get ships and tenders ready; the people are crowded together; they sleep on the decks; they are without cloaths to shift themselves; persons of all denominations are huddled together in a small room, and the first twelve months of a war afford a mournful task for the medical register, in the spreading of infections, and sickly crews. Hence a new commissioned fleet of ships can never be deemed an effective force at the early commencement of hostilities."

Blane and Lind appear to have realized the evils of impressment, but the former was perhaps too closely associated with the powers

that be, too circumspect, to speak out, and he had his own way of seeking to correct abuses.

"A general uniform for seamen has been mentioned in the valuable works of Lind and Blane, and supported by arguments so conclusive, that nothing can be offered against them. Amidst so many improvements in the navy, we are surprised that such a one as this has never been brought into universal practice. . . . The Hon. Captain George Berkeley, when he commanded the *Magnificent*, as a guard-ship at Portsmouth, had his men dressed in a particular way: they were easily distinguished from others, and became proverbial for neatness of appearance, and orderly behaviour when on shore."¹

"It appears to me, that desertion would be very much prevented by it: at least, it would increase the difficulty of escape, as disguise could not be so easily assumed. The cloathes might be manufactured of a particular kind of cloth; and an act of parliament passed, enforcing the same regulations and penalties as are usual in the army." This is followed by minute particulars of the style and amount of clothing to be issued or required. It was not until 1857 that a uniform costume was established by regulation.

Trotter was outspoken and insistent in his efforts to promote the status of the naval surgeon, and the second and larger edition of his "*Medicina Nautica*" contains his letter on the subject to Admiral Earl St. Vincent when he became first lord of the admiralty. It is a remarkable document. The medical officers of the army had recently received increase of pay and the army hospitals had been greatly improved.

"The question now turns; are the physicians and surgeons of the navy to be still doomed to poverty and neglect, amidst such unanimous and generous national favours to the army? No advocate within the walls of either House of Parliament has yet stood up to say, that the Physicians of the Royal Navy have no adequate establishment; that one half of the navy surgeons have no half pay at all; and that those who receive it, are scarcely allowed one half of the sum given to the army staff. Under such afflicting circumstances, and such apparent partiality, they must naturally look to an officer at the head of the Admiralty, who knows their value, and can feel for their situation. If you, my Lord, should treat the cause with indifference it must be abandoned as desperate."

"Taking the surgeons on the navy list collectively, they may be justly compared to any other body of professional men; some very

¹ When Lord Anson during his voyage around the world went up to Canton to visit the viceroy he put the 18 men and the coxswain of his boat in a costume resembling that of the watermen of the Thames. They wore scarlet jackets and blue silk waistcoats, liberally adorned with silver buttons, and had silver badges on jacket and cap.—Ed.

capable, and others perhaps not. There are many of the number ably qualified for the duties of the station; liberally educated, and equal to the exercise of the art in any situation. But men thus duly informed cannot be thought to consider themselves bound to a department of public service, that affords them only a slender present support, and holds out no provision for the infirmities of age. Hence the best qualified surgeon will be the first to quit the navy when opportunity offers, and look to private life for the reward of his talents and industry. Poverty alone can confine him to a sea-life. I believe this fact is daily exemplified among us; and we are only surprised that it does not happen more frequently.

"It is one of those singular but odious customs, which we often meet with in old establishments, that a private individual should furnish, out of his emoluments of pay, the articles wanted for public service. . . . In order to connect this business with naval forms, and to expedite service, I propose that dispensaries, or storehouses, shall be opened at the naval sea-ports, to supply ships with these articles when wanted; to be demanded by the surgeon, under the authority of his captain, in the usual manner. Four general dispensaries would be required for this business, under the direction of a surgeon who has served ten years in the navy, with a salary of 200 l. *per ann.* and house-rent. These dispensaries shall be at London, Chatham, Portsmouth and Plymouth. Ships on foreign stations shall be supplied at all places where naval stores are kept, under the care of a mate or surgeon of the list, with a suitable salary."

It was a real hardship to receive one's salary at irregular intervals or only at the end of a cruise. "Few if any men, after an expensive education, can afford to support themselves till the ship is paid off, sometimes not for many years when employed in a foreign station." Trotter urged quarterly payments of salaries. Once the officers have been put on a proper basis of remuneration the Government would have a right to require efficient service.

"The medical establishment being thus completed, and suitable encouragement given, government will have a right to prescribe forms of study for naval surgeons, which can alone secure persons duly qualified for the office. A term of study, which comprizes in two years two courses of lectures, on anatomy and surgery, medicine and chemistry, with at least six months' attendance at some reputable public hospital, would be requisite; exclusive of the usual apprenticeship as apothecary, which shall not be less than two years. Undeniable certificates shall be produced of these forms of education, for every one who is candidate for a surgeon's warrant. Mates of the second class and under may be admitted on easier terms."

The old and very marked distinction between physicians and surgeons still prevailed at this time, the former being superior in edu-

cation and standing. "No surgeon shall be promoted to the rank of physician under five years service as surgeon and mate; and their degrees as Doctors of Medicine shall be obtained in a regular manner from the Universities where they have studied the usual terms."

Trotter calls attention to the fact that in the whole navy there were but three physicians holding naval appointments as such who had obtained their degrees in proper fashion, he being one of them. "All the others including the whole Commissioners of Sick and Hurt, have been obtained by *proxy* elsewhere! Such is the state of medical honours in the Royal Navy of Great Britain, at the close of a nine years' war, and at the beginning of the nineteenth century!" Rolleston doubtless rightly sees in this a slap at Blane.

Trotter was opposed to naval men engaging in private practice, and this, allowed in 1795, forbidden in 1802, was finally authorized as being of distinct advantage in 1913.

"I would also recommend two inspectors of health, to correspond with the Admiralty only; to be constantly in motion, and to inspect all hospitals, guardships, slop-ships, convalescent ships, prisons, and prison-ships, ships fitted for carrying troops, tenders, and all the private sick quarters over Great Britain and Ireland. They should watch and regulate the internal economy of health in all these, and make occasional representations to their Lordships."

"Just as this work was going to the press, the news-papers give the account of some additional half-pay to naval officers. But it does not appear that a single word has been said of physicians, surgeons, or surgeons' mates. We are indeed an unfriended part of the community! Mr. Addington, himself the son of a physician, even speaks of the surgeons to look for bread from the merchant-service, as merchant ships are now to carry surgeons. But surely the nation ought to reward its own servants. Let me bring the business a little nearer to the Minister's feelings. Would this accomplished Statesman, the conciliator of party, unassuming as he is at the head of the Treasury, would he like to quit his present office, to be made a collector of the customs at Newcastle or Hull? The change hinted at would be as sad a reverse to the navy surgeon. Gentlemen who have expended a small patrimony on the study of their profession, without half-pay must be left destitute. I speak from experience at the end of the former war. The feasibility which accompanies the professional character, must be deeply wounded by this neglect. In the duties of our station we become inmates with our officers; we mix in their friendships, and share in their confidence. We attend them in the hour of bodily affliction, when their inmost secrets, their dearest concerns are intrusted to us; and they often expire in our arms. This frequent communication learns us to partake

of their heroism, and we grow jealous of every thing that detracts from the naval reputation of the country."

"The neglected state of the naval hospitals arose partly from the small stipend of the medical officers; but this could not justify some occurrences that I must relate, and which I leave as a warning to others. To some these examples may appear disgusting; so they are to my eye. When I hear of the medical attendant of a public institution having accumulated thirty or forty thousand pounds by the private exercise of his profession; by an irresistible impulse of imagination the ghosts of so many thousands of brave men rise to my view, who have fallen into premature deaths by unprincipled neglect.

"At the beginning of this war a seaman fell from the top of a ship fitting at Plymouth, and was wounded dreadfully. He was immediately conveyed on shore, but nobody could be found to open the gate of the hospital. At last access was obtained; but not a surgeon could be found; he was attending a gentleman of great fortune in Cornwall. It is to be added, the man died of the hæmorrhage from his wound.

"A post-captain, so ill as to be carried on shore in his bed, came to sick-quarters, and, for the convenience of such attention as he required, to the house of a friend. The first visitor was a clerk, who demanded that he should come to the hospital and answer muster, or be *run* on the books. On the third day a private physician called upon him, saying that he came at the desire of the surgeon of the Royal Hospital, who was attending the *accouchement* of Lady M. — at sixty miles distance!"

Trotter was a fighter. As fleet physician he claimed the prerogative of a professional interest in everything that touched the welfare of the seamen, sick or well. "A very interesting circumstance took place on the 20th of May, 1800, at a general survey at the Royal Hospital, Plymouth, where I judged it proper to attend, on account of a large number of the Edgar and Pompee's people being on the list for invaliding. These men had been sent on shore for fever; were now recovered, or convalescent; and brought forward for other complaints, or old hurts that never had been known to the surgeons of the respective ships.

"On entering the public room, I was accosted by Captain Creyke the governor, with his usual acuteness, and was asked by what authority I appeared there. To this I replied, the station I had the honour to hold. This was not deemed sufficient; he said he could only admit me by an Admiralty order. I then remarked, that the order for survey from the Port Admiral was addressed to Captains Stirling, Sawyer, and Pater, who were my officers, and to their opinions I would only submit. The captains very handsomely accepted of my attendance, as they knew I only came there with a view of

benefit to service; and as they considered it their duty to obtain every evidence that could save a single man from being invalided on false pretences. (Some time before this rencounter with the governor, in visiting some of the wards, I had dropped some angry expressions about bitters being put into the wine; which were artfully construed into interference with the medical practice. Remonstrances were immediately made to the Admiralty, seconded by the Board of Sick and Hurt; and their Lordships thought proper to restrict my visits. To this I made no reply, as I expected no support from Lord Bridport. Trusting to this order of the Admiralty, the governor thought he was empowered to exclude me from the hospital altogether. The captains present asserted their own authority, and the service triumphed. This business diffused general satisfaction throughout the fleet. This volume contains facts sufficient to justify a watchful eye over hospital establishments. The future surveys are reported to have been rather meliorated from my attendance. But on this occasion, had my opinion been taken, the whole of the Edgar's and Pompee's people should have been remanded to their ships without a single question being asked.) A general survey at an hospital has always been considered as a public day; and even on this occasion every surgeon of the fleet was present. An admiralty order directed my future attendance at all surveys afterwards."

It is proper in this connection to recall an earlier incident, showing that though Trotter stood for his rights he had worthy ideas of duty. "The salad, which I had represented in my letter to the Admiralty, as the best vegetables for our relief, was supplied in too small quantity to eradicate the disease. I wanted it to be given in large allowance to the different messes of the seamen; and that the fresh beef broth should be full of greens, or other pot-herbs. The lemons we could only consider for the cure. I demanded, therefore, five thousand pounds for daily consumption; and walked over the markets and gardens, to inform myself if this could be obtained. Our supply, hitherto, had seldom exceed *one hundred pounds* of lettuces, young onions, and mustard."

"The reader may smile at the idea of a Physician to a Fleet, attending the stalls at a vegetable market, or preambulating the country, to calculate the produce: but it never appeared to me below the dignity of the profession; nor did I consider it a mean task to serve the sallad with my own hands, from the Charon's quarter-deck."

"My station on board the Atlas not affording me opportunities to visit the sick as heretofore, or to communicate with the surgeons, I considered myself now rather as the register of their afflictions, than as the physician who ought to relieve them. This thought was

transmitted where it was sure of being candidly treated; but my retirement was not deemed expedient.

"At this season I suggested that I could be much more usefully employed at the port of Plymouth, to inspect the health of the ships as they now refitted there. This was approved of; for, I believe, some persons were glad to get quit of me on any terms."

"The people of the *Saturn* not being remarkable for cleanliness, suggested to me the necessity of having their bedding scoured at the hospital, as well as their cloathing. I therefore desired the Captain to insist upon it being done before his men returned on board. This was complied with; and for the *first time*, were infected blankets of seamen submitted to the purification of soap and water at a naval hospital. Who would suspect, that habits so unfavourable to health should exist in an hospital establishment; and at a time when most of our ships hold up such examples of cleanliness!—yet the expence of scouring a blanket only was three-pence."

"On visiting the Captain's people the third day after they were landed, in one of the wards of the south-east-wing, I found eleven patients without sheets to their beds; and on enquiring the cause at the nurse, I was informed that the matron was getting them ready as *fast as possible*. At this time the hospital was rather more than one third full!"

"The following order was issued from the *Ville de Paris* at sea:—

" ' MAY 4th, 1800.

" ' Mem°.

" ' It is my directions, that there are no sick in future to be sent to the hospital at Plymouth, from his Majesty's ships and vessels under my command, without the authority of Dr. Trotter, physician to the fleet, who will visit the ships whenever a boat shall be sent to him for that purpose.

" ' The respective Captains are to report to me, if, at any time, clothes or necessaries shall be sent from the hospital, with recovered men, uncleaned.

" ' The Surgeons of the squadron are to send to Dr. Trotter a monthly state of the sick, from the 22d of April, 1800.

" '(Signed) ST. VINCENT.'

"This order was the revival of medical discipline in the fleet; and restored my duties to the sick. But I received no intimation that an hospital ship should be fitted, which had before bestowed such unspeakable comforts to the Sick Bêrth.

"The order for the surgeons to furnish regular reports, puts it in my power to call upon them whenever a desire might be discovered for with-holding them, which was not frèquently the case.

"On consideration of the active duty of the ships that had cruized under Sir A. Gardner, all the winter, I represented to Earl St. Vincent the probable appearance of a prevailing scurvy; and my ideas on the prevention, from my experience and observations on the seasons and weather of the Channel. My opinion seemed to be treated with respect; and the fleet was informed, by his Lordship's order, concerning the supply of vegetables, when arriving in port, as correctors of scurvy.

"Arrived the *Temeraire*, over-run with scurvy. R. A. Whitshed desired me to report to him, in writing, the condition of his people; I therefore recommended a fortnight's allowance of fresh beef and vegetables, agreeable to the general practice in the fleet, to eradicate the disease.

"It appears that orders had been given, that no ship going to port, should be detained longer than six days. Unknown to me, a large supply of lemon juice was issued to every ship, as a preventive of scurvy, and ordered to be mixed with sugar and water, as lemonade. Before I was informed of this circumstance, I had recommended a sufficiency of fresh beef and vegetables to the *Superb*, which arrived a few days after. The Rear Admiral, who beheld this disease so general with great concern, I suppose, inclosed my Report to the Commander in Chief."

"July.—Sometime in this month, I was honoured with the following laconic epistle.

"Ville De Paris, off Ushant,

"July 15th.

"Sir,

"I very much disapprove your officious interference, to prevent His Majesty's ships under my command from putting to sea, the moment their beer, water, and provisions are completed, which is ordered to be done with the utmost possible dispatch; and I desire you will discontinue this practice.

"(Signed)

ST. VINCENT.

"To Dr. Trotter."

"On first perusing this letter I was rather at a loss to conjecture what it alluded to; but suspected that it must relate to reports given by order of R. A. Whitshed, on the prevailing scurvy in the *Temeraire* and *Superb*, mentioned above.

"On showing it to some of my friends in the fleet, they advised me to reply. To this I answered No: the temper that could dictate such a letter to a physician in the exercise of the best affections of the human heart, could not be satisfied with explanation. On such an occasion, if the medical character possesses any virtue within itself, to that he must fly for sanctuary; and let the storm rage that he cannot appease.

"It needs scarcely to be mentioned, that this letter is incorrect in point of service, for a medical officer has no power to detain a ship. I acted in compliance with the order of the senior officer on the spot. But although my report prescribed a fortnight's allowance of fresh meat and vegetables to these scorbutic crews, it did not imply that they should be detained a single hour in port; on the contrary, a month's vegetables, in similar conditions of scurvy, have often been carried to sea.

"The harsh terms of this letter, I must confess wounded me grievously. I became tired of a station that exposed me to unmerited suffering. I had lately displeased one Commander in Chief by claiming protection from insult; and a second was now reproaching me while fulfilling the duties of my office."

"It will not be wondered at, if after this transaction I resolved to trouble his Lordship no further with my correspondence; in this I was the more sorry, as I had cherished the hope, from his known discernment, to have pursued those plans of improvement in the medical department, which was left unfinished through the indisposition and retirement of Admiral Earl Howe."

"Lord St. Vincent has directed the Sick Berths to be enlarged, and more commodiously fitted for the sick. What a pity he did not point out the Berth of the Centaur for a model.

"August. Fresh *vegetables* are now sent to sea with every ship for the use of the fleet; but it does not appear that any *live stock* have yet been ordered.

"All the ships which have lately arrived have much scurvy. In those cases where it has appeared the ounce of lemon juice, and the ounce of sugar mixed with water, which is Lord St. Vincent's *formula*, do not seem to have checked its progress. A multitude of cases still occur, in which the surgeons are under the necessity of giving from six to eight ounces daily, in the usual manner, to effect a cure. The people in the Windsor Castle are evidently much emaciated by its use.

"Mr. Burd of the Temeraire, in his last report from sea remarks: 'In consequence of the recruit which the ship's company had in harbour, the general tendency to scurvy has disappeared. But it is still very marked, in many of those who were worst previous to our going into port; though even with them since coming to sea, by the use of lemon juice we gain ground. And I beg to remark, that their strength somewhat fails under its use; and emaciation of body is perceptible to the most inattentive observer.'

"Since the large allowance of sallad was served, the scurvy has continued to decline. The sudden change is wonderful. The squadron being now ordered to sea, the health of the men was considered equal to the expected cruize; but it could not be supposed

secure against the effects of a sea diet, where vegetables and fresh beef had no share. The Surgeons were served from the Charon with boxes of lemons, in proportion to the progress of scurvy lately marked among the people, and thirty gallons of lemon-juice, to be used when the fruit was expended. I reserved two hundred and fifty gallons in the hospital ship, lest any unforeseen length of time, or exigencies of service, might keep the fleet at sea beyond what we foresaw."

While attributing the highest honor to Lind, as the British champion of lemons in the treatment of scurvy, fully subscribing to their value, constantly agitating not only for their employment but for systematic and regular provision for a routine issue, Trotter considered it essential to make the general dietary adequate; that wine, fruit, green vegetables of all kinds, fresh bread, fresh meat, and general conditions favorable to health (ventilation, warm clothing, exercise) were even more important as preventive measures against scurvy than reliance on lemon juice alone.

"Whatever, therefore, may be the theory of sea-scurvy, we contend, that recent vegetable matter, imparts a *something* to the body, which fortifies it against the disease; and that in proportion to the quantity of this *something* imparted, making allowance, at the same time, for external causes, which counteract its effects on the constitution, the symptoms will sooner or later disappear. The preservative means ought, therefore, to be attended to, and we ought to trust only to the vegetable acid, when we can do no better. (It is the custom of service, for the purser to order his steward to buy vegetables, greens, or cabbages, for the fresh beef broth out of his necessary money; but there is no fixed quantity. There is a necessity for fixing the proportion, cost what it may. Why is an article of diet, that is the best security against a fatal disease, left to such uncertainty, or liable to be withheld by any individual, when its price becomes a little higher than common?)

"We have also found, that the preserved juice is very inferior to the fruit, in its entire and recent state; although, I believe, that great attention was paid to its preservation, and when there could be no suspicion of vinegar, or other acids, fraudulently added."

He preferred the concentrated crystals to the juice, and was not in favor of general unrestricted use of lemon juice for everything. In time the British service came to be supplied with what was supposed to be as good or better—the juice of West Indian limes instead of lemons—and the results were bad. It is scarcely necessary to remind the reader that we have here the original of our men's popular designation for a vessel sailing under the British flag.

On one occasion Trotter recommended that, as large supplies of oranges and lemons were hard to come by, advantage be taken of the

extreme cheapness of apples, selling in Devonshire at 1 shilling and 6 pence per hundred, to vary the antiscorbutic ration by this desirable and useful preventive. The admiralty was willing provided the board of sick and wounded judged it necessary. "These gentlemen, however, thought otherwise, by telling their lordships that they had provided a great quantity of fine onions at a small price, which, with lemon juice and vegetables, they esteemed equal to the correction of scurvy.

"Such was the opinion of two physicians sitting in a snug corner of Somerset-house, who neither heard the wind blow, or the tempest rage. The fleet off Ushant, it is true, had large supplies for preventing scurvy; but if a saving of public money could be made, by supplying articles of equal efficacy, and more desirable under the circumstances of service, I have no hesitation in saying, it ought to have been donè. On inquiry at the agent of the Royal Hospital, I learned that no change had been made in the purchase of onions for the fleet.

"Query. How long would these Commissioners of Sick and Hurt like to live on onions and lemon-juice, as preventives of scurvy, in a dreary winter cruise of twenty weeks, off the black rocks at the entrance of Brest harbour?

"While it is my duty to prescribe rules of health to a fleet of brave men, secluded from the comforts of the land, God! of Mercy! remind me of the Christian precept, *to do as I would be done unto!*"

"Admiral Lord Bridport came to Portsmouth about this time, to take the command of fourteen sail of the line. He had heard of the general scurvy, but supposed, from the orders given some time ago, by the Admiralty, that it was effectually overcome. His Lordship received my opinion on the subject with much attention, and entered earnestly into my manner of curing it. He desired the resident Commissioner of Sick and Wounded to order the quantity which I deemed necessary, whether it could be procured at Portsmouth, Gosport, or elsewhere. It was of little moment whether the sallad ought to be considered as a part of victualling, or medicine; the public service demanded instant relief. Had it been in my power to command it, it should have been brought from the Land's-end, in Cornwall, before the fleet had so long groaned under the affliction. We have heard of a Minister ordering a train of ordnance across the country, from Woolwich to Portsmouth, to save time; in this manner would I have wheeled the product of every distant garden to Portsmouth, lest the tooth of a sailor should drop from his gums, by a tardy conveyance of his deliverer.

'Deliberat Roma, perit Saguntum.'

Trotter was always harping on ventilation. "No department of service is more frequently the subject of conversation among officers and surgeons than the ventilation of ships. But although all are agreed, that a pure atmosphere is the object to be obtained, the ways

and means of effecting it are very different in different ships, so that as much quackery is displayed in this, as in any process of duty that we are acquainted with. One Captain is jealous of seeing the least moisture on his decks, while another orders them to be drenched with salt water every morning. Some contend for the purity of a hold, that is corrected by frequent, or constant fires, while others trust to the daily admission of clear water, for the perfect salubrity of the well, etc.

"The method of extracting foul airs from the lowest apartments of ships, has employed mechanical philosophy for a length of time, to invent and adapt an apparatus and instrument for that purpose. More attention has therefore been directed to the construction of pumps for dislodging a vitiated portion, than has been bestowed on a machine that should fill up the vacuum by a purer column. For when a quantity of foul air is extracted by the pump from the hold, the portion that rushes in is not a part of the pure external atmosphere, but what comes from the decks, already much exhausted of its salubrious quality.

"The history of Mr. Sutton's invention of airpipes for ventilating ships, to be found in Dr. Meade's works, affords many striking instances of those rebuffs, which ingenious men too frequently experience from public boards, public offices, etc."

"We need scarcely hint that the best substitute for washing decks is *dry rubbing with sand*. This practice fortunately gains ground; it affords a wholesome exercise for the people; and it has been well exemplified in the best regulated ships, that their decks look better than those drenched so frequently with salt water. This salutary reformation has probably saved more lives than any other alteration whatever. *Whitewashing*, at all time so delicate and cleanly, makes a part of this plan, and excites ideas of personal cleanliness among the people."

"The scuttles, and sometimes a few ports, are opened for ventilation. But these have their inconveniences. The man who lies nearest the scuttle finds the current disagreeable, and often shuts it. In harbours locked by high lands, it is a good plan to keep the ship's broad-side to the wind, by a spring on the cable. Much however might be done by having air-flews, so constructed as to communicate with the upper part of the ship, raised some feet above the gunwale, with scuttles fitted to open, as the wind may be on the beam, or otherwise. The lower end of these ought to come within two feet of the lower-deck; by which means the current of air would be diffused aboard, without blowing partially on any particular sleeping place. A very equal circulation would in this manner be maintained, when there was a necessity of laying tarpaulins over the hatches to keep out rain, or when wind-sails could not be put down to advantage in

bad weather. The *Medusa*, hospital ship, was fitted at Plymouth with air-shafts of this description, and, when duly attended, kept the hospital sufficiently ventilated. We can find no objection, as far as we have conversed with officers, to their general introduction throughout the navy: they can be so constructed as to be clear of the guns and ropes; and when we consider the great advantages of pure air to life and health, we ardently wish to see the trial.

"A ventilator constructed nearly on these principles may be seen on board the *Barfleur*, the contrivance of Rear Admiral Collingwood; and the Admiral, with great justice, attributes a large share of the improved health of his ship's company, to this flew for conducting from the lower parts of the deck, the air vitiated by respiration."

"In the well-regulated ship, where one of the main-top-mast stunsails, from its commodious size, is usually converted into a wind-sail, the lower end is generally put so low as the hatch of the main hold; and when the fore-hatch is kept open, that part of the hold is of course well refreshed. But the whole bottom of the ship cannot be purified in this manner, the spirit-room being surrounded by bulk-heads that are water-tight, for the security against fire. The bread-room ought to have a wind-sail to itself; and the forepart, which is commonly a close bulk-head, ought either to be grated, or constructed with folding-doors, to be laid open as often as may be found necessary. I consider the bread-room of a ship, from its present pent-up condition, the number of lights so frequently burning in it, and the noxious effluvia issuing from cheese, etc. as a species of volcano that is constantly throwing out pestiferous fumes to shorten and weaken life."

"We think a very commodious apparatus for ventilation might be constructed on the principle of the common bellows. This machine ought to be placed on the quarter-deck, or booms, over the waist, that no air might be thrown down but what is perfectly pure. Long leathern tubes being fitted to the nasal of the bellows, would by this contrivance convey a current of wind into every corner below, as you choosed to direct the mouth of the tube.

"The instruments now in use for extracting foul airs, are as much adapted to the purpose as the intention required; but the air which rushes in, to restore the place of that just extracted, gives no additional purity, unless a fresh column is flowing in from the upper parts of the ship. This shows the great necessity of flews and wind-sails, that no portion may be ever permitted to stagnate below, but a constant circulation throughout the whole preserved."

"In such situations of naval service, the able officer of a ship will be distinguished from the man of inferior abilities; and as far as it is possible, in the execution of duty, he will endeavour to give his

people no unnecessary toil. The rule for that must always be, that the refreshment from sleep at night should be equal to the fatigues of the day. 'The strength of a ship's company will thereby be reserved for proper occasions, for the hour of battle, or severe gales of wind. . . . "The nice criterion of discipline is to give seamen full employment without making duty a toil, and in all situations to remember they are men!"

"The best cures which I have witnessed during this prevailing malady, appeared to have been more owing to regimen than medicine. These happened in ships that had greater advantages of diet than others; and where the patient had not been weakened in the early stage of bleeding, under the idea of relieving stricture of the breast, as a supposed attendant of pneumonia.

"A multitude of cases have however been presented to me at different times, under the appellation of phthisis, that I believe had no disposition towards it. Uncommon recoveries have therefore been said to take place, as the effects of particular articles of medicine and superior treatment. All accounts of this kind are to be trusted with some qualification. Miraculous cures, even in the stage of purulency, have been talked of; but at the same time so vaguely detailed, and with such total neglect of the operation of other powers on the body, that little credit is to be given to their histories."

In discussing the prevalence and increase of nervous diseases due to the restlessness and excessive activity of modern life he reverts again to the impressment of sailors: "It is the fate of war that numbers of seamen are brought into the naval service against their inclinations; many of those under circumstances singularly severe; as happen to men that are impressed immediately on coming from foreign voyages, without even hearing of their relations, far less having a sight of their families. Nostalgia, which I take to be only a variety of hypochondriasis, is sometimes strongly marked in these cases, and emphatically speaks the language of human nature. How disgraceful is this practice to a nation that calls itself the most free on the face of the earth, that deprives of the privilege of citizenship those men to whom it owes its security, and to whose valour the sound of applause has been constantly heard! But it seems that only empty praises are returned for the first of all sacrifices, a surrender of their liberty. The present war has given birth to much warmth in the discussion of political subjects. But what authority can justify the involuntary service of any particular class of men? African slavery has been discussed among us; but, though Christianity is the national religion, there seems so little of the spirit of it in the country, that the slave-trade still continues, and ought to continue, if there is no remedy against impressing seamen."

"We also, on many occasions, meet with young officers, as well as old ones, of all descriptions, whose sensibility has long smarted under unmerited disappointment of honours in the line of their profession. Can any misfortune in life be more galling to a brave man, conscious of his right to promotion, than to see another preferred before him, without even a single pretension? Disappointments of this nature have brought many worthy officers to an early grave, and induced afflictions of body and mind that nothing beside could have produced. Ye rulers of the earth! Ye dispensers of honours! whom high heaven had deputed to do justice here below, remember that there is another world, where all your favours will undergo a scrutiny, and be tried as in a balance!"

Trotter was a great believer in horseback riding: "This besides the exercise and motion which it affords, presents a variety of images to the mind, which cannot fail to introduce a new train of ideas, and thus re-act on the body, but particularly on the stomach and intestines. This seldom fails to do good; and, if the ship is allowed to remain a fortnight in port during clear weather, a cure is obtained without much medicine. Exercise on horseback, as being so opposite to any kind of muscular action or amusement that can be obtained on board, is, to the sea-officer, by far the most salutary."

The dullness of life at a hospital and its depressing effects in certain nervous disorders are thus referred to:

"The naval hospitals are very little to be preferred to a ship in the treatment of this disease. They afford no amusement to seamen, and the great pleasure in coming on shore is to make the best use of their cunning to be put down on the list of invalids. [The author means persons to be invalided from the service.] All energy of mind is lost within these walls, and must be, till some means are devised by officers of address and intelligence to shake off that languor and indolence which we observe so general in the wards."

Trotter was anxious for a board of health to be established which would have power to compel the adoption and employment of measures recognized as salutary, but neglected through the greed, parsimony, or indifference of commercial firms, government officials, etc.

Trotter was an earnest advocate of compulsory vaccination and a great admirer of Jenner, to whom he transmitted a gold medal for which he had been instrumental in raising subscriptions from some 80 medical officers of the navy. It was not until 1858 that this step was adopted; meanwhile the disease was rampant in certain communities and aboard the ships of the navy. Trotter repeatedly made representations on the subject to the admiralty but without success, but in 1800 an order was issued by the commissioners of sick and

wounded to *permit* the surgeons to inoculate any of the seamen who were "desirous of it."

"Thus, these physicians have at last condescended to give an opinion on this popular practice: excellent humanists! There is scarcely a village in Great Britain that has not long shared of its blessings; and six months ago the Government of France borrowed a British physician, Dr. Woodville of the Small-Pox Hospital, to introduce it into Paris!

"At this time the Board of Sick and Wounded sent to the Royal Hospital at Plymouth a few lancets armed with vaccine matter, with directions, that if these should fail in communicating the disease, the medical staff of the hospital should send by the coach to London *two children* to bring down the infection of the fleet. Would it not have been preferable to send a Gloucestershire cow, as proposed in my second Volume? Before this time one thousand children had been inoculated in the vicinity of Plymouth for the vaccine disease, at which port our ships refitted."

From the hospital ship *Medusa* in 1797 Trotter had urged on the admiralty the importance of separate wards or buildings for small-pox at Haslar and other hospitals. "For these reasons and for many others, too minute to be detailed here, I beg leave to suggest to their Lordships some building, to be constructed at a sufficient distance from the hospitals, solely for the reception of Small-Pox, with kitchen, *washhouse*, etc. entirely confined to this institution."

"My proposal received due attention from their Lordships, and was submitted to the consideration of the Commissioners of Sick and Wounded; and their report was transmitted to me, which was briefly, that they did not see any necessity for a small-pox ward at a distance from the other hospitals. A subject of such moment had a claim to all the attention that could be given it; and the evidence which we have produced appears to us convincing. We think that a small building in the most retired part of the hospital-ground at Haslar and Plymouth, a small area round it for the benefit of convalescents, with a kitchen and washhouse, to cut off all communication with other patients, might be erected for a trifling sum.

"Some improvement, however, took place in consequence of this representation. A door communicating with the common staircase of other wards was built up; but let any person consider the facility with which this disease is imported, and let him examine the situation of small-pox wards at these hospitals, and he will not fail to think as we do. . . . When we, in the fleet, have so often followed up its source to the hospitals; is it not likely that it also is carried from them to the neighbouring towns, and kept constantly alive. We moreover contend that it is inconsistent with the spirit of medical jurisprudence to admit the small-pox infection within an

hospital with other diseases, to whom it is liable to be conveyed; we therefore choose to *record* the fact, that it may benefit posterity. 'If Rome must fall, we are innocent.'

"We shall hope to see some of the Gloucestershire cows transferred to the navy farm, that surrounds the walls of Haslar Hospital, for the purpose of inoculating the whole seamen at Spithead, and thus prevent any return of that infection into our ships of war, that we are now employed to defeat."

"Within the last three years of the war, and particularly in 1800, the instances of variolous infection being brought on board of the ships of the fleet were more numerous than on any former occasion. The disease at that time, in the natural way, was very general in the populous towns of Plymouth, Plymouth-Dock, and Stonehouse. The seamen, while on shore at liberty, were more than usually exposed, from the number of public houses that had lately been opened in the vicinity, and multiplied the sources of this as well as all other kinds of infection. I have only marked a few of those instances, as they appeared in the general history of health, where something particular had happened. In a multitude of them the infection had been carried on board by children in their mother's arms. Surely it ought to be strongly enforced in our code of naval discipline to prevent the introduction of small-pox. The Master at Arms usually attends at the gang-way to search the women for spirituous liquors; and at the same time he might with equal ease inspect the children, and where any suspicious eruptions, such as the small-pox, measles, or itch, appear, the surgeon of the ship ought to be called to decide on the propriety of admitting the woman or child. Where the disease is in danger of extending, inoculation cannot be too early practiced."

"Our experience continues to confirm the opinion formerly given, that small-pox cannot give out infection till *the third day*. This fact is of much importance in easing the minds of those who are in danger; and affords some certainty to means of prevention and early separation."

"While the vaccine inoculation was thus beginning, and meeting very general support, the medical officers of the British navy were not inattentive to the subject; and very early attempts were made to introduce it among the seamen. But all these have been only partially followed up; and at the time I am writing it seems entirely given over. In the summer of 1800 I requested permission of the Admiralty to introduce it into the ships of the fleet, with a view of procuring full authority, that all prejudices might be obviated which could rise against it. This was however not thought to be the proper channel for such an undertaking; it fell into other hands, and, as was foreseen, soon became neglected. It would have been an easy matter for me to have directed the practice in every ship as she arrived from

sea. In those instances where the variolous infection had been carried on board, and where I *personally* addressed the seamen on the safety of the vaccine inoculation, the measure was easily accomplished. Much good might therefore have been done with very little trouble: of two thousand men and upwards in the fleet who never had the small-pox, scarcely two hundred were inoculated with the cow-pox; and the remainder are left still exposed to a dangerous disease, whenever it may come in their way."

"The surgeon found thirty men who were unconscious of having had small-pox; this infection was brought on board by a woman of the town, who had buried her child the day before, and died of that disease; so that it had been carried in her wearing apparel. The men first taken ill messed with this woman, and sickened about the seventh day."

Fever of a malignant type and smallpox broke out on the *Orion*, Sir. J. Sumarez, commanding: "Some of these patients had symptoms of considerable malignity; and three of the number died on the fifth day from being seized. No nurse or attendant in our hospital was infected: I attributed this solely to the extreme exact attention to cleanliness, both in the persons of the sick, their body, linen, and bedding; a boiler with water was kept in constant readiness to wash every article of clothing as soon as it came from the beds of the sick, and a tub stood by for this purpose. Not even a handkerchief or night-cap was laid away till washed and aired. Only one patient died in the small-pox; which were of a milder kind than usually met with in adult subjects. As it was likely that the disease must now extend itself to every one on board the *Orion*, who had never been infected, people of this description, to the number of fifteen, were called to the quarter deck, and admonished by the captain and myself, to submit to inoculation, as an easy and safe mode of getting over the disease. Some of their prejudices, however, were not easily overcome; they were of the religious kind, and they did not consider it right to bring a disorder upon themselves. We combated this objection with the usual arguments, that Providence had put into our power the means of escaping a dreadful distemper by a trifling operation, and that it was impious in human beings to neglect it. They felt our advice more sensibly when they were told, that we considered it our duty to instruct them for their welfare, and that our only motive was their safety, for they were not to be compelled to undergo inoculation; but act as they pleased. I added, that two or three general inoculations of seamen had taken place on board the *Charon*, not one of whom had ever been confined an hour to bed. Ten of the fifteen consented to be inoculated, and had the disease in its mildest degree; the other five were doubtful of having had it in their infancy, and were not infected."

"In the small-pox, the disease seems incapable of infecting another person, before the second or third day of the eruption. This has enabled us to remove patients into the hospital and hospital-ship, after the disease was ascertained, so as to secure others from being affected. We have seen this in the Gibraltar, Valiant, Queen Charlotte, etc. In measles, however, this does not seem to hold good. The disease may be propagated at the most early stage of eruption; and if I was to be allowed a conjecture on the subject, I would say, that the contagion is the offspring of the catarrh which accompanies the measles."

Trotter's appointment as physician to His Majesty's fleet, under command of Admiral Howee, was on April 3, 1794, and on April 9 he was ordered to the hospital ship *Charon*. By the 16th of the month he had visited all the ships (32 sail of the line, 8 frigates, a sloop, a fire ship, 1 cutter, and 2 luggers) and submitted a tabular statement regarding the health of the personnel.

"It deserves to be recorded to the immortal honour of the officers in this Fleet, that the stock of their messes, consisting of sheep and poultry, with all the delicacies which their tables afforded, was cheerfully resigned for the support and comfort of the wounded. But their goodness did not stop here; they learned that the diet of the hospital was deficient in some articles which a wounded sailor could wish for; and sums of money were sent to procure them. My heart warms with indescribable emotions, while I relate a fact that deserves to be recorded with the pen of an angel." In June the fleet engaged the enemy and there were many wounded.

In July considerable sickness prevailed: "The infected ships, during the Month of July were employed in the means of stopping the contagion. Those officers who had confidence in fumigation, performed it every morning: the decks were kept clean, and the whole inside white-washed: constant attention was paid to the cleanliness of the people's cloaths, and the bedding was spread abroad every day to air. The seamen were ordered to keep themselves clean in their persons, and to shift more frequently. Fires were kindled in pots in the hold, well, and bread-room; stoves in the orlop, cable-tiers, and fore and after cockpits. Care was taken that the circulation of air through the wings should not be interrupted; and, besides the common windsails, two stunsails were fitted for the fore and main hatchway, so that every corner below was pure and compleatly perflated by the air; some of these sails were kept trimmed during the night, so as to counteract the effects of the heat when the ports were down. A quantity of vinegar in an iron pot was frequently, in the course of the day, converted into vapor, by plunging a red hot loggerhead into it, or sprinkled over the decks. Such were the method which our officers persisted in; besides, the cables, sails, cordage, with all kinds of stores, were brought upon deck during

the day, and the store-rooms, in the mean time, were ventilated and white-washed, so that not a particle of impure air could lodge anywhere. The immediate separation of the infected was, however, what I most depended upon; and not even the slightest cases were allowed to remain in the ship. The surgeons were directed to order their mates to walk frequently round the deck; and to watch those men who, while sitting in their berths, appeared dejected or solitary. This was always my own practice in an infected ship because seamen will sometimes withhold their complaints for a day or two, under the idea that an incipient fever is only a common cold."

"It having appeared to me, during the late operations of the fleet at sea, that the diet of the hospital ship was extremely deficient, in articles of comfort for the sick, which induced me to apply for some addition; the Lords of the Admiralty were pleased to comply with my application. We were now enabled to carry with us stock and vegetables, fruit, pickles, eggs, porter, etc. and to purchase milk, when in port."

Very interesting, after our experiences of 1917-18, are the references to influenza epidemics in the British fleets in 1782 and 1795: "In the year 1782, a similar catarrh prevailed in the Channel Fleet, then in the North Sea, under the command of Earl Howe. It spread with inconceivable rapidity over the whole. The fleet was obliged to return to port, and it was some time before the disease disappeared: a considerable number of deaths was the consequence." "It prevailed to such a degree, in the spring of 1782, as to render the ships almost inactive. The disease was then general throughout Europe: it spread from the shores of the Baltic to Holland and the Low Countries, from thence to England." . . . "The signal was made to unmoor or get under weigh in the morning; but the officers could not get the men out of their hammocks. It was in vain that they used threats, the people declared that they were unable to move. The surgeon and mates were sent for, who soon pronounced, that they were labouring under a violent disease. This was communicated to the Admiral; who doubted the report, and sent three captains with their surgeons, to examine the state of the *Fortitude's* ship's company. The captain found it exactly as related; the ship was ordered to Plymouth, where numbers of her crew were landed at the hospital. The other ships had not been two days at sea, till their situation was as bad as that of the *Fortitude*; some of them could scarcely muster seamen to take in sail: the whole returned to port.

"In the mean time, the Fleet in the North Sea suffered from the Catarrh in an equal degree; and was obliged to return to port to recruit the people. Some deaths happened in consequence.

"On the 17th of January 1795, the weather then very severe, and the thermometer at 17° of Fahrenheit, I was ordered to examine the state of the Cumberland, just arrived from the Nore, where she had been lately commissioned. I found one hundred and twenty men ill of Catarrh. The symptoms, however, were in general slight, with no oppression on the breast, and none were confined to bed: a few of the worst were sent to the hospital. As the acquisition of a 74 gun ship was of some importance at this time, the enemy's fleet being at sea, I recommended what was deemed needful in such a condition, and reported the ship fit for sea. Captain Rowley was active and careful in making the sick comfortable. He procured the whole, additional warm cloathing, particularly flannel jackets, which were the more valuable, as a great part of the crew had lately returned from the East Indies in the Vengeance. Care was also taken not to expose them to unnecessary cold and wet weather. Directions were immediately given to abstain from washing, to substitute scraping and rubbing with dry sand, additional fires were lighted on the lower deck. The sick list decreased from this time, and the Cumberland did well.

"A few days after my visit to the Cumberland, I was ordered to report to the Admiral the state of the Colossus from the number of sick, upwards of seventy, being returned in the weekly account. This disease was a Catarrh; and some were sent on shore with symptoms of inflammation, considerably greater than any in the other ship. The Colossus appeared to me to have her sickness much aggravated by washing decks; although I found that Captain Jenkins, then her first lieutenant, had opposed the practice, and represented it as hurtful. It was afterwards laid aside. The Colossus did not suffer from any future increase of the sick list, during the cruize.

"The Fleet being obliged to put into Torbay, in the beginning of February, we there experienced some severe weather. The Catarrh was now general in every ship. Some bad cases appeared in the Brunswick, Canada, and Prince of Wales. In the latter ship it assumed very much the type of a pure Typhus, with weak frequent pulse, dejection of countenance, great muscular debility, and stupor."

"When the catarrh was epidemic in 1782, I was surgeon of the Bustler sloop of war, at Plymouth: I was affected with the disease in a severe degree. In the present case I was also a sufferer, and had a relapse, from exposing myself too soon in the boat, to rain and cold weather, in Torbay."

Trotter's figures show that between January 18 and February 28 there were 5,300 cases in the fleet; that is, cases severe enough to be admitted to the sick list.

In July, 1796, Trotter addressed the Admiralty on the subject of contagion and disinfection, expressing emphatic disapproval of

the nitrous acid method which had recently received its favorable action. He repeated his views on cleanliness, isolation, prompt removal of the sick as the harborers of the contagion, and urged the employment of air flues or pipes to facilitate the escape of the foul air from the decks where people sleep.

"If it is found necessary in medical practice, in order to make attendants careful in their duty to the sick, to keep up their confidence in the preservative means against infection; I see no necessity for having recourse to deception, or the pious fraud of a placebo. Let the nurses of hospitals who attend patients in infectious fevers, be impressed with the idea, that if they shift the sick man often, in bed-cloathes and body-linen; keep him clean in his person, by frequent ablution, and change the air of the ward very frequently; that it will not only recover the patient, but will infallibly prevent other persons from being infected. Truth that soon decides doubts, will quickly assure every nurse, that this is the only certain method of prevention; and it is the only guide that ought to regulate the conduct of a physician."

He confesses to very little confidence in the power of drugs to cure typhus, suggests the need of studying a large number of cases comparatively, and of being slow to attribute unusual virtue to a remedy which appeared effective, since coincidently with its use the severity of the epidemic might have been declining.

In treating malaria Trotter reports the best results from administering cinchona every half hour for four hours before the expected paroxysm, esteeming a given amount thus used three times as efficient as when given during the whole intermission.

In speaking of yellow fever Trotter praises Rush, of Philadelphia. He goes on to deplore the dissipated habits of some of the officers embarked for the West Indies and to advise a reduction of the meat ration on going to the Tropics. Where heavy work has to be done in the noon hours it is the part of wisdom to employ natives for it.

"I would recommend a strict official return to be called, from every physician and surgeon now in the West Indies; and a detail of the method of treatment in the Fever, down to the minutest circumstance of medicine, diet, and regimen. This return would no doubt exhibit a gloomy catalogue of mortality; but it might go a great way to prevent a repetition of the scene. If accurate vouchers are required for every two-penny nail, or yard of cordage, how much more are they required for the safety and cure of a brave sailor or soldier?"

"Might not some method for generating artificial cold, be of service in this fever? I should like to know the effects of wrapping the body, for a length of time, in wet linen, some how after the fashion of cooling wine by suspending it in canvass bags, frequently sprinkled with water; such a trial is perfectly consistent with the most approved

opinions on the nature of the Yellow Fever; but it must be done during the inflammatory stage."

Discussing the health of seamen and the health of the fleet Trotter utters much wisdom: "Upon the first outfit of a ship, the men received on board her, should be examined with the most scrupulous attention, that disordered and infectious, or foul ulcerous persons may not be admitted. Such of their cloaths as are foul, and of little worth, should be destroyed, and the residue washed and fumigated; and their persons should also be thoroughly cleansed, by causing them to be washed with soap and water from head to foot. Their hair, if neglected and filthy, should be cut short, and if necessary their heads should be shaved."

"The nature of cleanliness too is often misunderstood; and I know of nothing of that kind which is so much mistaken, as the too frequent and indiscreet drenching the decks, and more especially those where the people sleep, with water, and particularly in cold latitudes during the winter. By this means I have known dreadful sickness *introduced*, and I have known it *removed* by a contrary practice. It would be deemed extravagant to advance an opinion, that the decks should never be washed; but I feel no reluctance in making a direct assertion, that it were far better that they should not be *washed at all*, than with that want of discretion and precaution, which so generally prevails."

"Their hammocks should be kept clean; but whenever they are washed, they never should be permitted to sleep in them until they are perfectly dry; for they had better spread their bedding on the deck, than lie in a damp hammock."

"Nothing is more commendable, or has a better effect on the people, than parade, order, and regularity in a ship of war; but these things should always be subservient to the health of the men. In line of battle ships, the ports being up and the guns run out, has a fine appearance; but, in this case, the health of the crew should be consulted; for in cold damp weather, and particularly when the ship is broadside to the wind, the exposing of the men to a current of air on such occasions, and when too they are in an inactive state, is extremely detrimental to their health, and brings on a train of dismal disorders. At these times the weather ports should be shut. A frame to fit every port, with double bunting stitched to it, is an excellent method to correct the evil consequences of too great a current of air passing through the ship at improper seasons. It prevents the ill effects of too much air, but admits enough for sufficient ventilation."

"The boats crews of a ship are generally ragged as well as sickly. They too often sell their clothes to buy *liquor*, but too often also they

part with them to buy food, on account of their being unnecessarily kept on shore, to the loss of their regular meals with the rest of the ship's company. It may with truth be said, that the inattention to the boat's crews of his Majesty's ships, is amongst the principal irregularities in the navy that require correction; for it destroys their health, and is a great cause of desertion.

"Amongst the various omissions which contribute to the injury of the health of the crews of his Majesty's ships, nothing seems more extraordinary than the general neglect there is of working the fixed ventilators. These should never stand still for a moment. A boy is capable of working them, and it may also be made a little extra duty for such as may be guilty of very slight offences."

"As soap has not yet been fully introduced to supply the people, the captains would do well to insert an article into their private orders, for the men to buy it at pay-day, and to be mustered with their cloathing at stated times."

"The Medusa, a 50-gun ship, having been fitted at Plymouth as an hospital ship to attend the fleet, I have been directed by the Lords Commissioners of Admiralty to take up my residence on board as soon as she arrives at Spithead.

"In the mean time, at my request, their Lordships have been pleased to order the same *improved diet* to be supplied as was customary in the Charon, with the addition of a milch cow, which may be considered the last article of comfort that we can suggest as practicable to be carried to sea: this gave all we could wish, without any unnecessary refinement."

"February 3d. The squadron returned to Spithead, in good health, without meeting the French fleet.

"The surgeons of the fleet at this time were served with a new code of instructions from the Board of Sick and Wounded, which now had the appointment of surgeons and mates throughout the navy. We observe, among some alterations, a very complicated form of journal; and what is rather singular, a weekly account is required to be sent every opportunity to the Board: the use of nitrous gas is also directed to be used to destroy contagion when it appears in his Majesty's ships."

"May 1st. The Medusa hospital ship joined the fleet at St. Helens, now complete in every thing that I could devise, for the comfort of the sick.

"14th. The hospital ship left the fleet off Plymouth.

"15th. Arrived at Spithead, and landed the sick; the weather fine.

"July 8th. Having completed our stores and necessaries, sailed from St. Helen's to join the fleet.

"12th. Joined the fleet in Torbay.

"The scurvy had appeared in most of the ships during the cruize, but cured with ease on board.

"16th. Received the sick of the fleet, to the number of fifty-four, chiefly ulcers and pulmonic complaints.

"17th. The fleet sailed, and also the Medusa with the above-mentioned sick on board.

"August 5th. Received the hospital stores, and sixty sheep to be distributed.

"6th. Joined the fleet, and distributed the necessaries, vegetables, stock, etc.

"20th. This day a seaman's wife was brought from La Pique, in the eighth month of pregnancy, subject to constant hysterics, and incessant reachings and vomiting. She was allowed one of the nurse's cabins, with suitable attendants. These complaints had been of some weeks standing, but seemed to increase as the uterus extended; and she was now extremely miserable. The usual routine of medicines, opium, castor, asafoetida, camphor, aether, etc., were tried in vain: lying on her back with the pelvis somewhat elevated, was the only posture that gave any relief. Every thing in the way of diet was quickly thrown from her stomach, and she seldom slept. In this state she continued till the ship came to Torbay, where she had relations, and was delivered of a healthy child the morning after she landed: from this time all her complaints ceased."

Incredible as it may seem, in view of our standards to-day, it is a well-authenticated fact that in the eighteenth century when a ship reached a home port it was immediately invaded by women, who took up their residence on board by the hundreds and remained until her departure. They usually attempted, in spite of the routine search at the gangway, to bring liquor aboard so as to increase their welcome, though this was unnecessary, as the tars were eager for their presence and hung over the side to pick out the prettiest as the watermen rowed them alongside. If a girl was not chosen she had to go ashore and the boatman got no fee for his trouble. Dancing, amorous dalliance, intoxication, now succeeded the slavery of sea life. When the time came to get up anchor the marines would clear the ship of the fair guests amid tears, outcries, lamentations, and piteous appeals to be allowed to remain aboard for the voyage. Occasionally a few enlisted men of unusual merit and standing were allowed to take their wives along.

"Some of our correspondents still regret that soap has never yet been issued by authority, through the pursers. We think it would be a great piece of economy to supply seamen with that kind of soap for washing that *lathers* with salt water. The Portuguese make a soap of this kind on the coast of Africa; but it might be done in England;

it depends on a larger portion of alkali, which adds a little to the price. This practice would save fresh water; and it must always be deemed a severe restriction when the people are not allowed water for washing: on many occasions it would be preferable to deny them drink rather than prevent regular cleanliness."

Trotter was always distressed and shocked, both as a physician and as a man, by excess in drink and preached the evil consequences of intemperance on every suitable occasion. He was a firm believer in the medicinal value of alcohol and not opposed to the issue, in moderation, of rations of good beer, etc. In August, 1800, he addressed the admiralty on the subject of better policing of the city of Plymouth and of reducing the number of gin mills there operating disastrously to the health and morals of the sailors.

"Although the subject of this letter may in some respects be deemed foreign to the department of medicine; yet, as connected with it in others in the general plan of preserving health in the fleet; I shall hope to be forgiven as an executive medical officer in requesting the attention of their Lordships to what may be conceived of more importance to naval service, than any thing which I have had the honour, for a length of time, to submit to their deliberation. Since the ships of the fleet have chiefly refitted at the Western ports; and the pay as well as prize-money of the whole have been paid at Plymouth, an unusual influx of money has of course taken place in these towns; but especially at Plymouth Dock. Where so large a number of seamen, from the increased number of ships in the fleet, have occasion to spend their wages, those tumults and excesses, the common offspring of their irregularities, when unrestrained by discipline, have multiplied in proportion. . . . The inhabitants of this place, in order to avail themselves fully of the rich harvest which the profusion of the seamen is daily holding forth, have, by interest and address, with the neighbouring magistrates, opened, within these eight months, not less than one hundred and forty *additional* public houses in the town of Dock only. . . . A certain number of houses have, by the strong grasp of avarice, been pitched upon for the purpose of gin-shops; and if the present inhabitant did not chuse to take out the licence for vending liquors, he was turned out of doors, and his house made over to somebody else. If such is the prevailing practice, their Lordships must be aware into what dangerous society the heedless and improvident seamen may be decoyed. In resorts of this description the general mutiny of 1797 was first planned; there the Irish catholic priests took up their abode, when they swore in the United Irishmen of the fleet to extirpate every protestant in our ships; and there also the crimps are concealed, that delude and persuade our seamen to desertion. Such is the degraded state of police of this town containing upwards of 25,000 inhabitants!

"It is by no means my intention, in this letter, to abridge the pleasures of the seamen; but I am humbly of opinion that much might be done to restrain their excesses, to meliorate their moral character, and to guard them against imposition; which would redound to the public benefit. . . . There is scarcely a day that I walk from my lodgings to the boat, but some of the horrors that I am now reprobating fall under my view. In those conflicts, which during a state of ebriety the seamen have among themselves so frequently in the streets, nothing can exceed the savage apathy with which they are beheld by the inhabitants, who value them only as the dupes of extortion; and look on, while they half-murder one another, with ferocious pleasure.

"What I would venture to recommend on this subject, is a total change in the administration of the police, and to be conducted after the model of Westminster. No person would then be permitted to open a public house but people of unexceptionable character; and constables or other officers might be so arranged to patrol the streets, as to prevent riot and disorder. The seaman would thus learn to spend his wages with decency, and return in due time to his ship, without endangering his health or his life, by continued intoxication. A police of this description, under respectable magistrates, would introduce a new æra into naval service; would be a most effectual check, and tend to extinguish that licentious spirit that has gone abroad among our seamen; and which runs much hazard of being renewed with fresh horrors in the event of paying off the ships at a general peace.—I have the honour to be, etc."

The admiralty promptly referred the letter to the Duke of Portland, one of the secretaries of state, asking that steps be taken to correct the evils reported.

"I have observed for some time past, that the ships coming into Hamoaze to refit, soon suffer from the excess of the people on shore. A week has sometimes done more harm than a cruise of five months; and not to be wondered at, since two hundred public houses have been opened in Dock, and its neighbourhood in addition to what were licensed before, within the last twelve months! Every walk or lane which the sailor is used to frequent, is now crowded with gin-shops.—I addressed another letter to the Admiralty on this subject."

"January 10th. The *Glory*, now refitting in Hamoaze, has, since the end of November, sent upwards of fifty men to the hospital, some in typhus, caught in the filthy stews of Dock, or produced by the poisonous spirits sold there. These cases exhibit in afflicting but real characters the account of which I some time ago sent to the Admiralty, of the increased numbers of public houses opened in Plymouth Dock, perhaps at this moment under the most degraded police of any town in Europe. If any future historian may wish to search for the

causes that have spread so turbulent a spirit among our seamen. he will find them best in these haunts of drunkenness and vice. What avail medical skill, or an investigation of remote and occasional causes of disease, while such polluted sources of destruction to health are overlooked. The injury to health in this instance is also aggravated, by a ninety gun ship's company being crammed into a hulk of sixty guns, made still more crowded by an immense number of women."

When the number of gin shops was finally reduced in Plymouth Dock from 300 to 100 "it was prophesied that I should be found murdered in the streets."

"This grievance to public service seems to have originated with some avaricious brewers or spirit-dealers and distillers, who had interest sufficient to lay hold of an immense number of public houses that obtained licences from the passive compliance of some neighbouring magistrates. A new model of getting custom was observed by the publicans, who received into their houses all the unfortunate women, to the number of some thousands. These wretches flock to the naval sea-ports for the wages of prostitution, after being debauched in the interior of the country by the idle and dissolute soldiery. Thus, the populous town of Dock was apparently converted into a huge brothel. The inhabitants themselves, eager in the pursuit of those profits which war produces, beheld with tame indifference their neighbourhood subjected as it were, to legalize prostitution; nor once thought what a dreadful example was exhibited in the face of open day, to contaminate the manners of the rising generation. The talk of magistracy, perhaps never became so ignominious, as in disannulling what itself had created: for the Duke of Portland had ordered the houses to be reduced to one hundred, so that two hundred were shut up!—The respectable part of the community acknowledged the obligations they lay under to a public officer, and a stranger, for correcting the police of their town.

"This business must be remembered as a great triumph to the naval service of the country. It has called the attention of the government to watch the proceedings of vitiated magistracy, and to protect, by wholesome regulations, a body of men, who, when from under the discipline and vigilance of their officers, are no better than inconsiderate children. Their health will by these means be preserved; they will escape the snares of the disaffected and designing, and their moral conduct will have a chance to be improved."

In 1795 a lady of fashion complained that she could not get lemons and oranges for her "large dinners to small parties" (Trotter's mild invective) because they had all been put in contribution for the navy. "It is a shame," said her Ladyship, "that the nation's money should be expended in this way. Captain P. tells me that these things are

not good for sailors and what is worse this physician can persuade Lord Howe to anything." On the other hand poor Trotter was boycotted by the market women of Portsmouth. They would not sell a cabbage or anything to his servant. "Your master" said they, "has spoiled our trade by sending all the *sallad* to Spithead."

Lord St. Vincent and Trotter locked horns on the subject of flannel underwear. The worthy admiral having expert knowledge by virtue of his exalted station took it on himself to issue a general order to the captains of his ships "to inculcate this doctrine" (the importance of flannel next the skin to prevent consumption in those suffering with catarrhs, coughs, and common colds), "in the minds of their surgeons who from *caprice* or *perverse opposition* to every wholesome regulation grossly neglect this important duty."

"It is plain from the nature of this order," says Trotter, "that some accusing spirit has been at work.—From direct application of the medical officers to Earl Howe, these articles became a part of naval cloathing in the severe weather of January and February 1795. At that rigorous season Lady Howe kindly presented a suit of flannel to every man on board the Queen Charlotte. All the surgeons of whom I have made inquiry, are in the constant practice of attending to the cloathing of the sick at all times. In these pages are proofs sufficient to rescue them from the imputation of neglect. Had his Lordship inquired a little further, he would probably have learned from their officers, that they are a respectable body of professional men; faithful and humane in the discharge of their office; and earning the humble pittance which they receive from their country, with as much integrity as any class of men whatever. Men that had received a share of polite, as well as a medical education, could not but be deeply wounded with the language of this order. The very practice which his Lordship here inculcates carries with it its own confutation. Only think of the condition of a seaman at hard labour, being drenched in perspiration with flannel next his skin: he has no wardrobe to shift himself, and if he does not shift he is no better than a walking stink-pot. It will be the same if he sleeps in bed with this flannel on: the practice is filthy and unwholesome. What consumes so much perfumery in the present day? it is the beau swaddled in flannel to cover the indelicate smell of his own atmosphere. If British seamen are to wear flannel next their skins, they are not subjects for a ship; they must soon lose the hardihood of constitution that fits them for their duty. Clothe them as warm as you please, but in the name of cleanliness give them linen or cotton next the skin. Read our history of phthisis, and judge whether flannel could have counteracted its causes."

"About this time Vice Admiral Lord Nelson, complained of a violent ophthalmia in his only eye, with a membranous substance

seemingly spreading fast over the pupil. His Lordship's flag was just hoisted in the *San Josef*. All persons round felt for his Lordship's indisposition, and many quack collyria were recommended and sent to him. I prescribed a dark room, and bathing the eye every hour with cold spring water, which in 24 hours had a surprising effect, and in two days more the inflammation was entirely gone. Cold spring water I have long thought the best eye-water.

"March 16th. The Admiralty have abolished the private surveys at the hospitals for consumptive cases, from representation, as they were deemed inconsistent with the spirit of naval service.

"I have also obtained a commodious decked vessel for carrying our sick from Cawsand Bay to the hospital.—The best period for obtaining favours from Ministers, is when they first come into power."

"The use of flannel next the skin has become a very general practice in phthisis; and the moment any person is phthisically disposed he is immediately recommended to wrap himself in this kind of clothing. But this custom is certainly to be followed with some qualification. To preserve the body in a grateful and equal temperature must be very desirable in this disease; but it never could be intended to keep flannel so long in contact with the human body without shifting, as we daily see done. Those who wear it sleep with it on, and must very soon become offensive. It therefore ought never to be continued beyond a single night without a change; otherwise the body will be confined as it were in a bath of impure air, that ought to be exhaled instead of being accumulated. Very frequent ablution of the whole surface should be regularly attended to during the use of flannel."

Ricord is commonly credited with having first differentiated between gonorrhea and syphilis, establishing them as separate morbid entities, in contradistinction to the views of John Hunter and others. Undoubtedly Ricord's talent and fame were such that his announced opinions carried conviction; but Trotter's "*Medicina Nautica*" was first published two years before Ricord was born, and Trotter not only gives it as his unhesitating opinion that gonorrhea and syphilis are distinct diseases but names Dr. Duncan, of Edinburgh, as the first person to promulgate this view. It seems remarkable that neither Lind (he speaks of a man who died "in a salivation for the pox" on the voyage from the Cape to Spithead) nor Blane had anything much to say on the subject of venereal diseases; but it is characteristic of Trotter, the earnest, thoroughgoing student and critic of men and manners, that he not only discusses this topic but makes frequent allusions to it throughout his works, and views it with lively concern. In his tabulated reports on the health of ships we find reference to venereal disease, but Blane's reports (the ones in his book, at all events) are not sullied by anything so vulgar. Trotter rejoices when at last the vicious system of charging a

sailor for the treatment of venereal disease was done away with. Ordinarily the fee was 15 shillings, and this, in conjunction with deprivation of liberty, of grog, and tobacco while on the sick list, combined to make the sailor conceal his condition from the ship's surgeon and treat himself or resort to quacks ashore. That the surgeon should have charged for such services is not surprising, seeing that he had to supply the drugs necessary for a cure. Gradually the Government became more liberal, and finally all sick necessities were provided free. This was another matter on which our worthy doctor was always commenting.

"On the whole, there were abundant proofs at hand, for a purpose, that I had long pressed with both head and heart. I therefore resolved to address the Commander in Chief, officially, on the business. My representation of the facts were received by Earl Howe and Sir Roger Curtis, with all that warmth of approbation, which the most affectionate concern for the comfort of our seamen could dictate, and for which the transactions of this fleet bear ample testimony. His lordship thought the subject of sufficient importance to engage the attention of the Lords Commissioners of Admiralty, and laid it before them. The Board of Admiralty, after making the necessary inquiries as to the amount of the sum, in the surgeons pay, were pleased to order an immediate stop to be put to the charge, and remunerated the surgeons by an allowance of money proportioned to the complement in different rates. This alteration has been received, by the liberal and scientific part of the list, with perfect satisfaction. To those on foreign stations, it is almost clear gain, for few or no venereal complaints prevail in the ships on East and West India service. Thus terminated a perquisite, illiberal from its institution, inhuman in its practice, and impolitic from its continuance. It forms an epoch in naval improvements; for hundreds of seamen, have annually fallen victims to its effects."

"It would be well if a safe method of treating the Recent Venereal Infection, could even be extended to the seamen; for although the abolition of the fine, for the cure, has done much in making them discover their complaints early, yet we have known a degree of modesty in some of them, independent of other considerations, prevent them from applying to the surgeon, lest their names should be handed in the sick list to the Captain. We are now told that the sale of mercurial preparations in the apothecaries shops in Portsmouth, and elsewhere, has diminished in an uncommon degree, since government remunerated the surgeon for the cure. . . . The herd of quacks and itinerant practitioners who frequented the sea-ports, and preyed on the credulity of our men, have also taken their departure from the failure of business. It was a grievous reflection to think that a sailor often paid so high as five guineas for medicines, while the disease, in

the mean time, was gaining ground, and for which he was obliged at last to go to an hospital."

"I shall therefore consider Gonorrhoea, with a train of symptoms peculiar to itself, as a primary disease, and incapable of producing the Confirmed Pox: the Lues, I also think never produces Gonorrhoea."

"If any thing can prevent venereal virus from taking effect, it must be immediate ablution of the parts; I apprehend nothing surpasses the finer soaps, and common water, which ought to be continued for some time, and repeated morning and evening.

"Now it requires some space of time for the poison to be in contact with the mouth of the sensible urethra, before it is sufficiently impressed to receive the disease: if, therefore, the matter which conveys the infection should be washed off, by soap and water, before the impression is finished, you will escape the complaint; and this is the whole secret of prevention."

Apparently Trotter did not distinguish between chancre and chancroid. He urged the use of bluestone, and there is no question that for the latter type of sore this substance is of unequalled excellence: "I have also known a small Ulcer heal up in a week, without giving any uneasiness, or having been treated as such; and the patient was led to think that a beginning Bubo was the first symptom of the disease. On the whole, the result of my own experience is, that neither Bubo, or Lues, can be produced without preceding ulceration in the genitals, or other parts that have been in contact with the venereal virus."

The serious blunder of Trotter's career was his exerting himself to have a line officer appointed to conduct the affairs of naval hospitals, which were often disturbed by the dissensions between the professional staff, the steward, the agent, the nurses, and by the utter lawlessness of the patients, who regarded a hospital as a prison and were forever trying to get away. It may be that at the close of the eighteenth century a doctor or surgeon in the navy could not command the respect necessary to enforce authority, even had he been invested with it; but one is surprised that with all his independence, his ability, his grasp of the new and untried, Trotter was biased by the potent influence of environment into thinking that the management of men and things is possible only to those who bear a certain hall mark. While a physician was nominally at the head of affairs, authority was divided between him and a hospital council, and then there were the commissioners for sick and wounded in London ready to interfere or override. Certainly the experiment of putting either a port captain or a civilian at the head of a naval medical establishment could only arise through prejudices based on

traditions. At Plymouth the consequences were always distressing, often laughable.

The first governor to arrive was received with mock state. When the hospital was full of sick and wounded from Sir John Moore's army in the Peninsula there was much insubordination, and the governor insisted that the guard should turn out and the drums beat a march whenever he went by. The sergeant, on seeking instructions, was told by a young Irish officer to play the "Rogues' March." The governor did not recognize the piece, but was delighted at the noise. Everybody else nearly died of laughter. In 1846 Sir John Richardson, the physician to Haslar, pointed out the inconveniences of the system and suggested the propriety of letting doctors conduct hospitals. Similar objections were voiced by others until in 1870, when at last the control of hospitals was ceded to medical men.

GILBERT BLANE (1749-1834) was a native of Ayrshire, Scotland, and belonged to a well-to-do merchant family. At 14 he entered Edinburgh University, where he received a classical education and then began the study of medicine. (His M. D. was from Glasgow in 1778.) He began practice in London under the most favorable auspices, highly recommended by his old teachers and having for friend and patron William Hunter, who early recommended him as medical attendant to an invalid nobleman in high favor at court and in the best society. When Sir George Rodney, in 1779, assumed command of the fleet sent to raise the siege of Gibraltar he took Blane along as his physician, but in a purely civilian capacity. During the engagements incident to the fleet's mission there was a shortage of officers, and Blane was wounded while serving as a sort of aid for Rodney to carry messages to the guns, etc. It was perhaps in return for these services that he was appointed physician to the fleet. In January, 1780, he accompanied Rodney's fleet (in an official capacity this time) when it was hurriedly dispatched to the West Indies, the principal theater of the naval war with France, Blane remaining in American waters until the conclusion of peace with the revolted colonies.

In 1783 he returned to civil life, and through the influence of Rodney and others was appointed physician to St. Thomas's Hospital, London, a post which he occupied for 12 years; and then restricted himself to private practice and such work, in an advisory capacity, as was assigned him by the Government in connection with naval and military affairs. In 1795 he became one of the two medical commissioners on the Board of Sick and Wounded Sailors, and during the seven years that he held the position was able by reason of his high standing, reputation, and general popularity to secure many enactments of great importance to the health of the service. Thus, in 1796, the use of antiscorbutics was made mandatory. It was on

his recommendation that soap began to be regularly issued to sailors and charged against their pay; that the list of free medical supplies was greatly increased and later (1804) made to include all requisites; that a space in the forecastle was definitely assigned as a sick berth and provided with important accessories. By these and similar innovations, suggested indeed by others but secured through Blane's influence, the health of the British navy was wonderfully improved. Thus, in 1782, when the personnel (seamen and marines) aggregated 100,000, the proportion of sick (transferred to hospital) to well men was 1 to 3.3. Thirty-one years later with a personnel of 140,000 the proportion of hospital cases was only 1 to 10.75.

Blane's career furnishes a good illustration of the value of diversified types of men in every organization. Lind and Trotter were perhaps more original, more enterprising, and the latter showed a noble readiness to suffer hardship for the "beloved navy," which by reason of disability he was forced to leave with such keen regret, but it is patent to every reader of his writing that Blane attained standing not only through his "external graces" and "artificial attractions," but because of conspicuous merit. It was owing to his influence that the labors of his predecessors and contemporaries were made available for the benefit of the sick of the service. And Blane was a deep-thinking physician and a man of solid parts and not a mere society doctor; far from it. He never lost his Scotch accent, and a parody current in his day described his countenance as "sanctified, devout, and death-like." He had not been eminently successful as a teacher when attached to St. Thomas, but he was esteemed what we would call to-day an expert in sanitation. In 1797 he visited officially the Russian fleet wintering in British ports. In 1809 he accompanied a commission sent to investigate the unusual prevalence of sickness among the troops on the island of Walcheren. His report was indorsed by the army doctors (though it was most unusual to have a civilian physician and an ex-navy one at that, passing judgment in such matters) and favorably acted on by the Government. It was for this service that he was made a baronet. Blane's study of the smallpox epidemic which developed in 1818 and seemed to discredit inoculation received Jenner's hearty approval, and was republished and circulated at the latter's expense. In 1825 we find him writing to the East India Company, and in 1832 publishing a general warning about the nature of cholera and its mode of spread. His views were indorsed by the Royal College of Surgeons, but, through the force of public opinion to the contrary, an opposite stand was adopted by one of the local boards of health. Quarantine was relaxed, and soon after Great Britain was visited by a severe epidemic of cholera. One of the victims was Blane's own wife.

Blane was a Fellow of the Royal Societies of London, Edinburgh, and Göttingen, and member of various home and foreign scientific societies, and was physician to George IV and William IV. He died at the age of 85 at No. 8 Sackville Street, Piccadilly, after suffering for many years with pruritus senilis to such an extent that finally he was taking a drachm of sold opium in 24 hours.

Lind wrote a number of books and papers on medical and sociological topics, besides his "Observations in the Diseases of Seamen," published in 1785, which has the greatest interest for us. The preface to this work contains passages illustrative of Blane's manner of expression and of his modes of thought:

"I feel greatly indebted to the surgeons for the punctuality and exactness with which they furnished these returns, and I ought not to suffer any opportunity to escape of expressing my value for this class of officers. They are perhaps more regarded in our service than in that of other nations, but it would be for the public benefit if they were still more respected and encouraged. To men of liberal education and sentiments, as surgeons ought to be and generally are, the most effectual inducements for them to enter into the service, and to do their duty when there, are flattering attentions and a certain degree of estimation in the eyes of other officers. This in its operation on liberal minds would, to a certain length, stand in place of pecuniary emolument. It is what may be called, in the words of a late eloquent writer [Burke], 'The cheap defence of nations.' Liberality of manners on the part of superiors is at the same time a more likely means of ensuring a conscientious performance of duty in this profession than strict and distant behaviour, which may, indeed, operate on the minds of those whose functions are merely mechanical; but how can it infuse that tender attention to human sufferings and that sense of duty which may induce a man entrusted with the health and lives of his fellow creatures to act his part with propriety and effect?"

"It behooves everyone who engages in a profession so important and at the same time so full of ambiguity as that of medicine to discipline his mind properly with regard to the laws of evidence and the rules of investigation, so as to draw fair inferences from facts, to avoid credulity on the one hand and scepticism on the other, both of which are equally unfriendly to the discovery and application of practical truths."

"The last impediment I shall mention to the progress of medical truth is the great difficulty of appreciating testimony. We have not only to guard against our own credulity and self-deception, but those of others. In consequence of medical practitioners not accurately distinguishing between the operations of nature and of art, drawing inferences from individual cases, and being biased by favourite

theories, not to mention the allurements of vanity and self-interest, which it is to be hoped seldom influence the regular members of the profession, it is a melancholy truth that there is perhaps no branch of human knowledge in which there is so great a want of correctness with regard to recorded facts."

Blane deserves special credit for emphasizing the fact that no naval organization will have any noteworthy success in health conservation so long as the subject is left to the discretion or indiscretion of individual commanders, some of whom may be zealous but ignorant, while too many are distinctly indifferent. Sanitary regulations should be based on scientific principles, drawn up by persons having special knowledge and promulgated by supreme authority for general execution. He strikes the keynote of the naval surgeon's duties in these words: "My object has been prevention as much as cure. The means of prevention are also more within our power than those of cure; for it is more in human art to remove contagion, to alter a man's food and clothing, to command what exercise he is to use and what air he is to breathe, than it is to produce any given change in the internal operations of the body. What we know concerning prevention is also more certain and satisfactory, inasmuch as it is easier to investigate the external causes that affect health, than to develop the secret springs of the animal economy." Inasmuch as prevention depends particularly on a knowledge of the external causes of disease, he collected and arranged all the facts on the subject coming under his notice. When serving with the West Indian fleet he got the admiral to require for him a monthly sanitary report from the individual ships, so that he might be fully acquainted with the general situation, prevent overcrowding of any one hospital, and have a basis for recommendation to the commander in chief regarding diet and other measures. When the fleet was in port he visited the hospital every day. Each of the West Indian islands had a hospital of a sort, but they were often very inadequate to the demands of such an unusually large force. He made it his business to supervise them and procure what they needed through personal appeals and official representations.

Blane made suggestions to the Admiralty with a view to improving conditions along the lines laid down by Lind. His method of collecting data was followed by Trotter. They provided a statistical system for the navy. The personnel of the fleet was decimated by fever, dysentery, and scurvy. The proportion of deaths to personnel in one twelve-month period was 1 to 7 of the enlisted men. The average sick list had 1 for every 5.

The fleet had left England at Christmas, gone first to Gibraltar, and then made the run across the Atlantic. On reaching the scene

of operations the *Montague* was in the best condition of all and so continued. This was ascribed to the practice observed on her of immediately stripping and washing every man sent from the guard ship to fill the complement. Arrived at Barbados in May the fleet put ashore 750 sick, exclusive of those from three vessels so badly crippled in battle that they could not beat to windward, and so went to St. Lucia. On Blane's suggestion the men were here provided with soft bread, fresh vegetables, and milk.

The following is given by the author as typical of the reports forwarded from the ships, but the lengthy remarks of the *Alcide's* surgeon are omitted:

State of health of His Majesty's Ship Alcide, Carlisle Bay, Barbados, June 1, 1781.

Sick now on board.	Died in the course of the month: Of fever—		Sent to the hospital in the course of the month: All of scurvy—
Fevers.....	4	1	35
Flux.....	5		
Scurvy.....	26		
Catarrh and rheumatism.....	7		
Total.....	42		

But the most frequent cause of death in the fleet in American waters was dysentery, owing to the incurable ulcers of the great intestines and the added depreciation of health from scurvy and sea diet. Blane felt safe in ascribing dysentery to an infectious process, because once cured on board ship the disease did not recur, nor did the disease prevail at hospitals, where great care was taken to separate the infectious from other cases.

Speaking of overcrowding as a cause of mortality, Blane notes that the hospitals at St. Lucia and St. Christopher were but temporary establishments, intended only for urgent cases. In 1780–81 there was a death for every five and one-half patients sent to the former and one for every six sent to the latter. When a proper and regular hospital was established in the last two years of the war the mortality dropped a half. However, mortality does not depend wholly on the skill of the attendants. "Some officers are unwilling that any man should die on board of their ships for fear of dispiriting the others, and many were sent to the hospital in the most desperate stage of sickness that they might there die." The hospital at Jamaica had room for 300. During May, June, and July, 1782, there were put ashore 539 men, of whom 161 died. On the other hand, in New York, out of 825 sent ashore, only 94 died, the hospital

having superior advantages. Fields of cabbage had been planted in the vicinity, due to the humane attention of Admiral Digby, who also had cows purchased to supply milk.

The following table shows deaths in the foreign-station hospitals for the whole war:

During whole war at hospitals at home and abroad.

	Admitted.	Died.	Proportion: Nearly one in—
Gibraltar.....	2, 131	203	10
Barbados.....	4, 604	861	5
Antigua.....	6, 099	914	7
St. Lucia.....	3, 363	478	7
St. Christopher.....	853	142	6
Jamaica.....	10, 088	1, 672	6
New York.....	17, 880	2, 179	7½
Total.....	45, 018	6, 449	7

The deaths from disease in the fleet, both aboard and at hospitals, while Blane was fleet physician—a period of three years and three months—came to 3,200, exclusive of those due to wounds.

Blane contrasts the discipline and internal economy of British and French men-of-war, to the great disadvantage of the latter. The French never washed their decks, but let them be cumbered with lumber of every kind, not even taking down bulkheads in battle. This must have increased the mortality enormously, for splinters wrought more havoc than projectiles. Night and day, even in hot climates, their gratings were covered with tarpaulins. Their lower decks had no scuppers as outlets for water and filth. This drained into the hold as into a common sink, indescribably putrid and offensive. The common French soldiers, says Blane, were averse to throwing their dead overboard (as the English did), since their relatives desired the remains to be buried with religious service when the battle was over.¹

On the 17 ships that came out from England during February and March, 1782, the crews enjoyed excellent health, owing to their supplies of sauerkraut, molasses, and wine. The *America* was the freest from scurvy, owing to the "extraordinary humanity" and attention of the captain who, as soon as any of the men were taken ill, allowed them wine and other refreshments from his private stores. The use of that word humanity is significant. A captain showed extraordi-

¹ That most uncommon English fighter, Horatio Nelson, begged Hardy, the captain of the *Victory*, not to let him be thrown overboard, saying that if the people did not want to bury him in St. Paul's he wished his body sent to his father's parsonage. It fell to Surgeon Beatty to put the dead admiral in a hogshead of alcohol, inspect it from time to time, and perform other necessary services on the much-delayed homeward voyage

nary humanity when he exerted himself for his sick, but the Admiralty could receive unequivocal testimony as to value of lemons and fresh vegetables in preventing scurvy, and yet allow nearly half a century to go by without compelling the use of them, in spite of the reports of men dying like sheep for lack of those simple measures. It is heartrending to think that conduct like that of the *America's* captain should be eulogized as extraordinary humanity, for it compels reflections upon how much inhumanity was abroad. Peter Parker threatened to flog any man who would not salute so much as a midshipman's coat drying on a broomstick. It is all very well for Jane to say that flogging was not so terrible an affair as we of to-day might think, but no one can read Masfield's vivid word picture of the ordeal and of other incidents of life in the royal navy without realizing that it was hell afloat; without understanding why sailors drank and drank to excess. It was their only solace.

A later visit to New York gave opportunity for the fleet to land 600 sick, the maximum available hospital accommodation. The remaining 900 being kept in their respective vessels did well, for they received meat three times a week. Thirty cases of limes captured in a prize were distributed. Spruce beer was served daily. Every man got 4 pounds of apples and one-half pound of soap every week at the public charge. The wounded and other proper cases were actually allowed to go ashore for an occasional walk. Admiral Pigot's zeal for the good of the service and his natural humanity made him listen to whatever was for the benefit of his men. (Another officer of the same name was murdered in his cabin for his extraordinary inhumanity.)

Speaking of the good health enjoyed on the *Montague* and *Royal Oak* during a long period of exposure to sickness which affected the rest of the fleet, Blane says: "A particular combination of causes is necessary to produce a disease, no single one, however powerful, being sufficient without the concurrence of others. What seemed to be wanting here was the predisposition requisite for the admission of disease into the constitution; for the ships which enjoyed this happy exemption were such as had long-established and well-regulated crews accustomed to the service and climate." He records that in 1740-41 Admiral Vernon¹ had sent 11,000 men to hospitals, and 1 in 7 died, besides those who succumbed aboard and in two hospital ships; but this period included the disastrous expedition to Carthage, and there were many cases of yellow fever. Vincent's force was composed of 15,000 seamen and marines. Blane gives the predisposing causes of infection as loss of blood, intoxicants, fatigue, fasting, diarrhea, grief, fear, and previous habits.

¹ For whom Washington named his famous estate on the Potomac. He instituted the practice of serving out liquor diluted—grog.

Blane declared that fleets should not stay at sea more than six or seven weeks at a time on sea victualing. At least one-fourth the time should be in port. But if ships were properly supplied with antiscorbutic fruits and juices they might keep the sea for four or five months.

The fleet had much sickness during June at St. Lucia, but was in a better state than the troops ashore, who lost 50 to 55 men a week in a force of 2,000 men. The army ashore in the West Indies lost 3,036 men during 1780, or 1 in every 4 men. Sickness was considerably reduced as a result of Lord Rodney's order for "all rum stills in the neighborhood to be destroyed." For February, March, and April of 1781, 17 ships (there were no returns for 7 others) lost 44 men from fever, 48 from dysentery, and 63 from scurvy.

"After collecting the returns for each month, I made abstracts of them in tables, in one column of which the complement of each ship is set down, in order to form calculations of the comparative prevalence and mortality of different diseases at different times."

TABLE II.—*Showing the proportional sickness and mortality in relation to the whole numbers on board for 14¹ months.*

Months.	Proportion of sick and wounded on board on the first of the month: One in—	Proportion of sick and wounded sent to the hospital in the course of the month: One in—	Proportion of deaths on board in the course of the month: One in—
June, 1780.....	13	68½	418
July.....	17½	80	163
August.....	18	227	80
September.....	9	6	188
October.....	14	25	.....
November.....	33½	192	265
December.....	16	67	185
January, 1781.....	14	60½	316
February.....	18	413	214
March.....	15½	30	201
April.....	11	59	169
May.....	9½	17	188
June.....	12	40	701
Mean proportion.....	15½	93	227

¹ I have omitted May because the author mentions certain details which he thinks make the figures misleading.

Returning from New York to the West Indies in November, full particulars of the disastrous hurricane of October 10 were learned. Four frigates and as many sloops of war either foundered or were wrecked and about 1,000 seamen perished.

"As ships of war must be guided by the unavoidable exigencies of service, it would be absurd to consider health only; but if this were

to be the sole object of attention, a certain salutary medium could be pointed out in dividing the time between cruising and being in harbour; and it is proper that this should be known, that regard may be had to it, as far as may be consistent with the service."

Speaking of tropical service, the author says: "It can not be too much inculcated on those who visit tropical countries that exercise in the sun and intemperance are most pernicious and fatal practices, and that it is in general by the one or the other that the better sort of people, particularly those newly arrived from Europe, shorten their lives."

In discussing the mortality tables of the Haslar and Plymouth naval hospitals for a period of 25 years, Blane names several reasons for the better showing made toward the last, one being "the greater observance of cleanliness and dryness and the stricter enforcement of discipline, in consequence of the conviction now entertained by officers, of the indispensable necessity of these to the health of the men under their command; the general use of lemon juice, so judiciously and liberally allowed to ships at sea for the three last years; the late increase of encouragement to surgeons, and the operation of the regulations established and put in force by the medical board of the navy."

"* * * and even considering men merely as a commodity, it could be made evident, in an economical and political view, independent of moral considerations, that the lives and health of men might be preserved at much less expense and trouble than what are necessary to repair the ravages of disease."

"Every one who has served in a great fleet must have remarked that out of ships with the same complement of men, who have been the same length of time at sea, and have been victualed and watered in the same manner, some are extremely sickly, while others are free from disease. Is it not naturally to be inferred from hence, that the health of men at sea depends in a great measure upon circumstances within the power of officers, and, indeed, upon their exertions much more than medical care?"

"It is to be remarked, however, that exercise and temperance may be carried to excess, and that in these there is a certain salutary medium; for, when labour and abstinence amount to hardship, they are equally pernicious as indulgence and indolence. This is strongly exemplified in seamen; for, in consequence of what they undergo, they are in general short lived, and have their constitutions worn out ten years before the rest of the laborious part of mankind."

"The most chronic complaints, which a long course of fatigue, exposure to the weather, and other hardships tend to bring on, are pulmonary consumptions, rheumatisms, and dropsies. It is also to be considered that the complaints, particularly the last, are farther

fomented by hard drinking, which is a common vice among this class of men, and they are led to indulge in it by the rigorous and irregular course of duty incident to their mode of life."

Passing from a minute chronicle of the incidents of the West Indies service to a discussion of certain diseases and health conditions generally, Blane proves himself a practical and thoughtful observer. He cites facts, and always reasons about them, seeking an explanation. In many instances his inferences are incorrect, but at any rate he had hit on the precise phenomena which we to-day consider significant. When he believes he is right, Blane can be emphatic; when he is in doubt he hazards an opinion, but humbly admits that he is in *terra incognita*.

"And in order to guard against the diseases of this climate in general it would be more proper to take some large doses of bark once in either of these periods than to make a constant practice of taking a little, as I have known some people do, by which they may also render their body in some measure insensible to its good effects."

"There are few subjects more abstruse and difficult of investigation than this of infection." "Why is the body incapable of being affected more than once by certain morbid poisons, and whence comes the striking and curious differences of susceptibility to infection in different individuals at the same time and of the same individual at different times?"

The mode of transmission of typhus puzzled Blane extremely, because his observations seemed to contradict each other. He never suspected that an animal parasite might be at the bottom of it, but he clearly perceived the rôle of dirt and intimate contact.

"The infection of fever differs from the specific morbid poisons—first, in its not depending in all instances on the disease itself, the common source of it being the stagnated effluvia of the human body from the want of a change of linen, while there is at the same time an exclusion of fresh air. These are the circumstances which concur to produce febrile infection in jails, ill-regulated hospitals, and ill-disciplined ships. Secondly, this infection may exist about the persons of men without producing the disease. This happens to those about whose persons it was generated. Thirdly, it may be caught more than once in life."

"It is necessary that those who direct the navy, either in a civil or military capacity, should be aware of the causes of sickness and mortality, in order to guard against them as far as is practicable. From an indolent acquiescence in this belief of the hardships, and inconveniences of war being unavoidable, I have known neglect to arise in the conduct of officers with regard to those under their command, as if it was not the duty of a commander to employ his utmost

attention to alleviate the misfortunes and mitigate the sufferings of his fellow-creatures; and we have seen that much more of the calamities of war arise from disease than from the sword. The like excuse might be framed for the neglect of stores and arms, which the hurry of service might equally expose to injury. We see, indeed, infinite pains taken to prevent cordage from rotting, and arms from rusting; but however precious these may be as the necessary implements of war, it will not be disputed that human hands are still more so; yet, though there is the additional inducement of humanity to watch over the health of men, I do not think that this, in general, is studied with a degree of attention equal to what is bestowed on some inanimate objects."

Regarding immunity he says: "Infection, like some other poisons, does not so readily affect those who are accustomed to it, and therefore those who are in the habit of being exposed to it, frequently escape its bad effects, especially if it is gradually applied, as must be the case with those about whose persons it is generated. For the like reason, physicians and nurses are less susceptible than others; and strangers, who are accustomed to a pure air, are the most susceptible of any."

He quotes some pertinent remarks from the writings of Dr. Short, and says: "It is observed by Dr. Short that contagious epidemics are more frequent and fatal in the country than in London, and this may probably be accounted for on the same principle, for every person in a great town is exposed to the breath and effluvia of others, and to a variety of putrid exhalations, which are unavoidable where multitudes inhabit together, but they are so used to them that they are not affected by them, whereas in the country, where people are less accustomed to each other's company and less used to impure air in general, they are the more readily affected when infection is introduced among them. It may even admit of a doubt if any society of men living together are entirely free from morbid contagion. It certainly sometimes happens that a ship with a long-established crew shall be very healthy, yet if strangers are introduced among them who are also healthy sickness will be mutually produced."

In contrast to Trotter, he admits the evils of impressment, but seems to regard this measure as a necessary one, or at least so firmly established that no criticism is permissible. "The mode of manning the navy by pressing, I take it for granted, is unavoidable; at any rate it would not become me to arraign a practice which has had the public sanction for ages. It is, however, one of the principal means both of generating and spreading the seeds of disease, in consequence of the indiscriminate seizure of men for the public

service and the confinement¹ that is necessary to secure them. And as the exigencies of the service make it necessary to admit persons of every description, there is no other remedy for this evil but to annihilate, if possible, the contagion that may thus be conveyed into ships of war."

"Among brute animals, as well as the human species, acute infectious distempers are generated by their being confined together in numbers, in all-ventilated places. A complaint of this kind is common in dog kennels, and also among sheep, where they are housed during the winter, or when too much crowded on board of ships. The glanders in horses is little known but in large stables, where the air is not freely admitted. Birds in aviaries are also subject to a peculiar disease."

"It may be farther remarked in favour of cleanliness, that it is not only directly conducive to health, but is naturally connected with habits of good order, sobriety, and other virtues. The most cleanly men are always the most decent and honest, and the most slovenly and dirty are the most vicious and irregular.

"Officers might be very useful in making an early discovery of complaints, by observing those who droop and look ill in the course of duty; for seamen think it unmanly to complain, and have an aversion to be put on the sick list. I have heard of a method practiced in some ships, of keeping a book on the quarter deck for the officer to mark the names of such men as might look ill, or might be missed from duty upon calling the roll, in order to afford the surgeon a means of finding out those who should be the objects of his care.

"Those whose profession it is to superintend the health of the ship, would find it for their ease and interest, and should consider it as their duty, to walk over the different decks once a day, or every other day, in order to make an early discovery of those who may be taken ill."

"Should any officer object to the trouble and inconvenience of all this, let him reflect for a moment how much more troublesome and inconvenient, as well as noisome and disagreeable, sickness itself proves to be; let him reflect that the efficiency of the ship, considered as a bulwark of defence, or an engine of annoyance, depends on the number of healthy hands, and that his own character is to depend on the exertions to be made by them in the day of battle, not to mention the attention due from him as a man to the sufferings of the objects themselves."

"The great attention that has of late been paid to dryness by officers of the navy seems to be one of the principal causes of the superior

¹ Enlisted men rarely got liberty during the progress of a war because those who had been impressed would seize the opportunity to desert.

health which at present prevails in our ships of war. One of the methods lately practised for producing dryness has been to rub the decks with sand heated in the oven."

Blane gave serious attention to the diet of the well and the sick afloat and ashore, and made recommendations which were in part adopted and laid down in instructions drawn up by the Admiralty in 1796 for the guidance of navy surgeons. Unfortunately, the provisions for enlarging and varying the diet of the sick were soon abrogated, and our author deplores the necessity of having to depend on the generosity of the officers. "This practice is highly honourable to the character of our sea officers; but anything dependent on the casual bounty of individuals is too precarious a provision in such an important point of service."

Blane made a number of experiments in preserving foods, and found that beef could be cured with but half the usual amount of salt by using hydrochloric acid, pimento, and juniper berries; but, as he remarks in another paragraph, it is not the salt that gives scurvy, but a deficiency of other things in the diet. He reiterates his recommendation for more issue of fresh bread, insisting that it would be easy and economical to do so, and citing the example of the French ships.

Table exhibiting the daily allowance of provisions for each man in the navy.

	Biscuit.	Beer.	Beef.	Pork.	Pease.	Oatmeal.	Butter.	Cheese.
	Pounds.	Gallons.	Pounds.	Pounds.	Pint.	Pint.	Ounces.	Ounces.
Sunday.....	1	1	.....	1	$\frac{1}{2}$	.....	.....	.....
Monday.....	1	1	.....	.....	.....	1	2	4
Tuesday.....	1	1	2	.....	.....	.....	.....	.....
Wednesday.....	1	1	.....	.....	$\frac{1}{2}$	1	2	4
Thursday.....	1	1	.....	1	$\frac{1}{2}$	.....	.....	.....
Friday.....	1	1	.....	.....	$\frac{1}{2}$	1	2	4
Saturday.....	1	1	2	.....	.....	.....	.....	.....

"This has continued from the last century till the alterations above mentioned, all of which, except the introduction of vinegar, currants, and raisins, have been made in the three last years of the war which ended in 1783. When the stock of small beer is exhausted, half a pint of spirits is allowed daily, diluted with four or five times its quantity of water. When wine is supplied, the daily allowance of it to a man is one pint. Other exchanges are usual on foreign voyages, such as three pounds of flour and half a pound of raisins, or half a pound of currants, or half a pound of beef suet pickled, in lieu of a four-pound piece of beef, or a two-pound piece of pork, with pease. Half a pound of rice is allowed for a pint of oatmeal."

"Though it has been my object to introduce as many articles of diet as possible, independent of salt provisions, it does not follow that these are in themselves unwholesome. They are pernicious by being made almost the sole and exclusive article; but if used in moderate quantity, they are even in some respects well adapted for the food of seamen."

He wisely remarks: "It does not appear that it is the salt quality alone of the provisions used at sea that makes them productive of scurvy, but also the want of their native juices and of the nutritious principle."

"The large utensils employed to boil the provisions are made of copper, and it sometimes happens from neglect that these are allowed to contract a rust, which is one of the most active poisons we know. The neglect consists chiefly in allowing anything acid, or what is liable to become acid, such as gruel or burgoo, to remain for a length of time without being washed out; for when victuals have been prepared in the boilers thus uncleared, they produce the most violent effects, even to the loss of life, as once happened in a ship belonging to our fleet."

Blane discusses the importance of pure drinking water and how to obtain it, and gives details for its aeration, ascribing full credit to Lind for his contributions to the subject. He tells of the value of quicklime, and how it will destroy algæ and small insects.

Of clothing, "the most artificial circumstance in the life of man," he writes at length and subscribes to Lind's advice about uniforms for the crew. He notes the efficacy of hydrotherapy in the treatment of delirium, and urges that when sweating is indicated it be brought about by proper sudorific drugs and not by piling on bedclothes and shutting out the air. Every naval hospital should have facilities for giving warm baths at short notice. Blane is inclined to doubt the advisability of cold baths and affusions in fevers. The matter is one for observation and reflection. It may be "a valuable remedy or only one of those to which novelty and fashion give a temporary currency." With proper impartiality he cites the success which attended this practice in the hands of a certain physician of the West Indies, who used the cold bath in a number of cases with such prompt relief of symptoms that the patients themselves called for it day and night. On the other hand there was the case of a girl with smallpox who bathed in a brook and died!

"The good effects resulting from the indulgent treatment of men are, that it encourages them to enter into the service, and to do their duty with cheerfulness and resolution. There is something more daunting to the mind of man to see his companions suffering under oppression and languishing in disease, or perishing miserably from sores or sickness, than in the terrors of fire and sword, which, .

as we have seen, make the least part of the calamities of war. The good treatment of seamen, in so far as it regards their health, is by no means incompatible with strict discipline. Indeed strictness and even severity is necessary with seamen; for it is observed with regard to men who are used to arbitrary government, that they can not bear indulgence and relaxation. But the steady enforcement of discipline and regularity is so far from being akin to cruelty, that it tends to prevent not only sickness but the commission of crimes, and consequently rendering the infliction of punishment less frequent and necessary. The chief excellence in the character of an officer seems to consist in uniting strict discipline with indulgence and humanity."

Part II concludes with words of profound wisdom, as appropriate now as in the days of the broad-minded man who penned them: "The subject of the preceding remarks has been the prevention of disease, and it has appeared that the means of this are not so much in the province of the medical profession as of those who are entrusted with the direction of the navy in a civil or military capacity, and that with regard to cure and recovery also a great deal depends upon them, by their having it in their power to make a suitable provision of proper diet and cordials. The great importance of the subject will plead my excuse for again calling to mind that such attentions are not only dictated by humanity, but would be the greatest wisdom in an economical and national light, considering how expensive it is to *replace* men and to support invalids, not to mention that it is upon the health and lives of men that every public exertion essentially depends, and upon which may depend not only the character of officers but the national character and safety on the day of battle."

"There is no situation of life in which there is room for more virtues, more conduct and address, than that of a sea officer. The men are thrown upon his humanity and attention in more views than one; they are subject to a more arbitrary exertion of power than the constitution of the state authorizes in civil life. It is the character of the seamen to be thoughtless and neglectful of their own interest and welfare, requiring to be tended like children; but from their bravery, utility, and other good qualities they seem entitled to a degree of *parental* tenderness and attention from the state they protect and the officers they obey."

It will not be amiss to devote a few lines to Blane's therapy, noting particularly the points in which it approximates in some measure to our own. Opium in dysentery is to be used with great caution and only in certain stages or combined with starch in soothing enemata for tenesmus. Ipecac in doses of a grain or two and salines are to be preferred. When the stomach will not tolerate Peruvian bark it may be administered per rectum; and arsenic is a valuable adjuvant in

treatment of intermittent and remittent fevers. Warm baths are highly commended for a variety of purposes. In many cases of illness diet is of more value than drugs; likewise fresh air, nursing, and general regimen. Blisters are often of great service in certain fevers. Do not remove the scarf skin. To do so delays healing and causes subsequent discomfort to the patient. Rectal feeding can be successfully practiced. He cautions against zeal in bleeding and purging in fevers. Mild measures are preferable—sudorifics and enemata. Diarrheas induced by medication may be fatal, but an apparent diarrhea from irritation due to scybala calls for an evacuant from above.

Opium must be given with consideration of pulse and circulation. In some it does not bring the desired ease and quiet, but excitement. Its good effects are often best brought out by using it in combination with other drugs. Blane shows himself in treatment an eminently conservative and thoughtful physician.

A very interesting chapter is that treating of wounds in action and their results. In the naval actions of the fleet in April, 1782, the wounded aggregated 810. Of these 354 died—266 outright, 67 on board their ships, and 21 at hospitals. Seventeen of the deaths were due to tetanus—a very common complication. The small number of deaths at hospitals was due to delay in transferring patients. Treatment of tetanus was almost uniformly unsuccessful, whether amputation when symptoms developed, salivation by mercury combined with opium, or opium and hot baths were resorted to. The last named measure occasionally succeeded.

“There is a singular species of accident to which engagements at sea are liable, called, perhaps improperly, *the wind of a ball*. In whatever manner it is accounted for, it is a fact that a part is sometimes severely hurt, and even life destroyed, without any visible external injury or breach of the parts, nor any appearance of the body from whence the injury proceeded. This is a fact which does not admit of doubt, but the manner in which the effect is here produced is a matter of conjecture. It is perhaps owing to the compression and tremor of the air in consequence of its resistance to the motion of the ball.” [One is reminded by these observations of the accounts of so-called shell shock in the early period of the World War.]

“The class of wounds most peculiar to a sea engagement are scorches from the accidental explosion of gunpowder, and in most of the campaigns in which I have served they have been very frequent and fatal.

“In the battles of 1780 and 1781, one-fourth part of the whole killed and wounded was from this sort of accident; but on the 9th and 12th of April, 1782, only two accidental explosions of gunpowder happened in the whole fleet, by one of which one life was

lost; by the other, two. This difference was owing partly to greater experience and habits of caution acquired in the course of the war, and partly to certain improved methods in working the artillery introduced by Sir Charles Douglas; these consisted, 1st, in wetting the wads, which prevents their inflaming and blowing back when in battle the weather side of the ship is engaged; a circumstance which, without this precaution, gives occasion to a number of accidents, by the burning parts catching the loose powder, or setting fire to the cartridges. 2dly, in the use of goosequill tubes and small priming boxes, made of tin, instead of the large horns formerly in use, whereby great quantities of powder were scattered about and exposed to accidental fire. 3dly, in the use of locks, which was practised with great success in several ships, and was found to make the operation both more safe and more expeditious." When locks were first introduced the prejudice against them was strong, but in the battle of the Nile a ship whose guns were provided with the device was so superior in marksmanship as to afford a convincing argument in its favor.

With the modesty becoming to a man who professed himself no surgeon, Blane brings up the mooted question of whether amputation should be performed immediately or later. He quotes Dr. William Hunter's statement that "men whose strength has been impaired by the confinement and long suffering from an injury survive amputation more frequently than those who undergo it in the height of their health and strength after an injury"; but adds two cogent reasons why a sailor might with advantage be operated on at once: The motion of a ship renders the management of fractures difficult; the constitution of sailors by their manner of life is at all times approximated to the state which Hunter considered favorable to amputation.

In general close action, which the British commanders loved because it permitted the fighting qualities of the individual to come into play, was productive of fewer mortal wounds than fighting at long range. At close range the velocity of cannon balls was so great that they perforated the ship's sides without splintering the timbers. "A quick-flying ball makes an aperture smaller than its own diameter, whereas a spent one produces innumerable deadly splinters, at the same time shivering the object it strikes.

"It frequently happens that men bleed to death before assistance can be procured, or lose so much blood as not to be able to go through an operation. In order to prevent this it has been proposed, and on some occasions practiced, to make each man carry about him a garter, or piece of rope yarn, in order to bind up a limb in case of profuse bleeding. If it should be objected that this, from its solemnity, may

be apt to intimidate common men, officers at least should make use of some such precaution, especially as many of them, and those of the highest rank, are stationed on the quarter deck, which is one of the most exposed situations, and far removed from the cockpit, where the surgeon and his assistants are placed."

Toward the close of the book there is a chapter that to-day would be designated "On first aid." Then come several score prescriptions in Latin, among them treatments for gonorrhea and malign ulcers.

In the concluding pages is found a very illuminating letter to Rufus King, "Minister Plenipotentiary from the States of America to the Court of London," dated November 26, 1798, which begins thus:

"SIR: I sit down to perform the promise I made you this morning, of putting on paper some remarks on the nature of the yellow fever and the means of preventing it.

"In doing this I shall chiefly confine myself to those views of it in which the magistrate is concerned. The adopting of measures for the prevention of disease is one of the most important duties of a wise and patriotic Government, and the discovery of these means, as well as the efficiency of the steps to be taken, must depend on a thorough knowledge of the causes by which it is excited and influenced."

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EDITORIAL.

HOSPITAL STANDARDS.

A standard is that which is stretched forth, emblazoned, or set on high as a distinguishing sign. The Roman legions had eagles of metal for their standards; the nobles of the Middle Ages had long, narrow flags, on which were wrought badges, crests, or mottoes. There is also the standard or upright part supporting some essential feature of a mechanical contrivance, such as a sewing machine, dynamo, etc.; and the inverted knee timber placed on instead of under a deck is called a standard. Hence, the secondary meaning of standard is a criterion or gauge of excellence, purity, reliability, staunchness, etc. We have standard coin and standard weights and measures; standards of morals, and standards of a profession.

To-day we hear much about standardizing drugs, standardizing education, standardizing colleges, hospitals, and the like. In one of our States it is held that a valuable guide to determining the standing of its hospitals is the fullness, accuracy, and care with which the records of patients are prepared and kept. A competent student of the hospitals in the State in question reports that, judged by their records, but few of them are up to standard; and the mortifying feature of this fact is not so much the failure to appreciate the importance of records as the positive objection to them, for obvious reasons, on the part of those staff physicians who prefer saying a thing is so to proving it.

A hospital's system of records might at first blush seem a poor gauge of general excellence, and certainly a hospital might have elaborate modern buildings, comfortable beds, a fine dietary, good nurses, and able doctors in attendance, and no records; but the general professional excellence and scientific attainments of the members of the visiting and resident staff, as well as their diligence, honesty, and integrity, can perhaps be judged by no better single criterion than the official records of the institution.

From the civic, legal, industrial, and social standpoint, as well as in relation to the accumulation of data for scientific progress, records are indispensable. The hospital which declines to maintain adequate records is not up to the modern standard of public obligations, even though it may discharge its duty to individual patients as regards

treatment and contribute much to the relief of sickness or disability. A patient who leaves a hospital cured is for the moment satisfied, jubilant, overflowing with praise of the institution; but a time may come when it is vital to his social, legal, financial, moral, or physical interests to be able to prove a variety of things which are not clear in his memory or for which documentary evidence is necessary. Nurses, superintendents, clerks, doctors, and patients come and go, but records remain to give testimony as to dates of admission and discharge; as to whether the Wassermann was positive or negative; as to the grounds for a diagnosis, the reasons for an operative procedure, the character of the injury produced by an assault, the date when a serious symptom developed, etc. Even if all the personnel of hospital administration were not subject to the law of change and the inevitableness of death, memory is unreliable. The details of the most spectacular drama, of the most phenomenal malady, become indistinct in a fortnight; and any physician who believes he can from memory alone recall with scientific accuracy the essential data of a case attended a few weeks before (unless indeed he had no intervening cases) deceives himself.

It is not to be wondered at that some hospitals neglect the subject of records or even that some physicians shrink from making entries of judgments and findings that may prove them ill-informed or lacking in diagnostic acumen, and cumbersome, redundant forms may require an undue expenditure of time and energy on clerical work; but it is astonishing that any standard institution or any high type of physician should deny the value of records.

The young practitioner constantly neglects to keep accurate records of his private cases. With youth goes pride of knowledge, inexperience of life, and the small narrow view restricted to considerations of the moment. The young interne in the civil hospital is concerned primarily with learning to treat the sick and cares little for the secondary benefits which the full discharge of his duty may confer on his successors and the patients' successors. At our naval hospitals the junior is apt to regard everything required of him beyond the exercise of curative functions as an evil arising out of the complications of military routine; as needless, unproductive drudgery, imposed by some old fogey, for whom the charms of tennis, horseback riding, or a moonlight flirtation have been superseded by pedantic joy in crossing "t's" and dotting "i's." But the failure by one man or one institution to discharge the duty of recording the essential features of diagnosis, treatment, and disposition simply throws additional work on some other individual or office, with, perhaps, the additional task of making excuses and apologies.

Of all hospitals those under Government administration are the ones with the least excuse in case they are unable to produce on de-

mand satisfactory evidence of the nature, extent, and results of the work they perform.

The superintendent of a well-organized hospital knows that bill books, vouchers, copies of requisitions, though a great bother, are indispensable to the businesslike conduct of affairs, and that there will be more bother in the end if all essential papers are not properly indexed and filed. The same business principles apply in the case of the patients, and it is the duty of those in authority at our naval hospitals to indoctrinate newly commissioned medical officers with this idea.

To write up a completed case is as tame and uninteresting as the boy's long walk back from the scene of a conflagration to which he ran heedless of distance, but the interests of patient and hospital are just as much, though less brilliantly, subserved by the recording of all the facts as by the clever operation or the miraculous cure. He is a poor public servant, whatever his innate ability, who balks at a duty because it does not interest him or contribute to his fame.

The first outcry from the overworked junior medical officer is about reduplication of work. Why a laboriously prepared health record for the individual patient and then a copy of the whole thing in the files of the hospital, since a patient regularly admitted at any naval hospital always brings his record with him, and so furnishes a history of his case?

With the parenthetic remark that a great many health records contain evidences of haste and carelessness rather than labor in their preparation, it is replied that the record accompanying the patient and that retained at the hospital are intended to subserve wholly different purposes and should not be identical. The health record is essentially a summary of findings. It should give the date of sickness or injury, the character of the disability, the number of sick days, the disposition or termination of the case, and the grounds for classing it as in line of duty or not in line of duty. These are facts essential for subsequent treatment, for the information and action of boards of survey, commanding officers, etc. It is important that these records shall not be bulky or voluminous, and they are not intended to be bulky, but to furnish an outline of a case as a guide for diagnosis, treatment, and disposition. It frequently happens in obscure, complicated, difficult cases and in those involving fine distinctions from the standpoint of pension or retirement that the grounds for diagnosis and the details of treatment must be inquired into and verified. A communication addressed to the hospital of which the patient was an inmate, for months under the observation of a large and competent staff, utilizing elaborate laboratory and other methods of investigation, elicits the extremely unsatisfactory reply that the man's health record went with the patient at the time

of discharge and that no other information is available. It is extremely unsatisfactory when calling for the essential data of a case to be referred to the medical record of a man in the Mediterranean or the Philippines, and to have to write abroad and wait three or four months for an answer, only to learn that the record contains no minutiae, and be invited to communicate with such and such a naval hospital, from which "doubtless the information may be obtained in full."

It would seem that if the laboratory man, the operating surgeon, the X-ray official, each makes a report, and the nurse keeps a chart, it is in no sense a repudiation of work for the ward officer in charge of the case to summarize the findings and record neatly, accurately, and briefly the essential features of the case. That he will have to think, that he will have to take pains to do this well, is evident, but it is the business of medical officers to think and to take pains, not only in curing the immediate condition, but in assuring the patient's future welfare and securing for him all he is entitled to later, whether it be understanding treatment by others or a just decision by the commissioner of pensions.

AS SEEN FROM WITHIN.

There are people in the medical corps who read the *BULLETIN* even to the editorials. In relation to remarks in the January issue about the plans to increase the attractiveness of the medical service of the Navy to those who are not yet in it, the following postulates were laid down in regard to better conditions for existing members of the medical corps by a recent caller who has 10 years of naval service to his credit. His comments are set forth in full, as they may represent the views of others in his category—i. e., 200 and some medical officers of the rank of lieutenant and lieutenant commander.

1. Opportunities for professional advancement should not be in favor of the newly enrolled to the neglect of men ranging from 30 to 40 years of age, who have been in the service a matter of 5 to 15 years, done good work, and given evidence of integrity, zeal, and capacity, and who still have from 34 to 24 years to serve.

2. The man in civil life who is not hampered by mental myopia and is mature enough to look at all sides of a question will not be attracted to a service which heaps up privileges for the newcomer but leaves the tried and faithful servant to flounder along as best he can, drifting away from his profession of physician into a purely administrative sphere while still a young man. He knows that if he comes into it he will not always be new to the service, and is naturally curious as to the treatment and opportunities he may count on when, with the lapse of time, conditions become less and less favorable for resignation and a fresh start elsewhere.

3. It should be brought home, once and for all, in a forcible and convincing way to the nonmedical authorities that while going to sea has its uses, a cruise does not represent for the medical man the apogée of chances favorable to professional progress as in the case of line officers. On the contrary, sea service means the restriction of opportunity, the limitation of development in the practice of medicine and surgery, whereas shore duty may permit illuminating experience of school, clinic, laboratory, operating room, and ward, and stimulating personal contact with teachers.

4. It is perfectly practical, perfectly feasible, and highly desirable to permit officers who have made one full cruise to be granted a minimum of four months "study leave" immediately after each subsequent tour of duty afloat or on foreign station, provided they apply definitely for the same and specify the course they wish to pursue, the number of hours a day they are willing to pledge themselves to devote to work, the place selected, etc. It might be possible to make broad general arrangements for lowered or nominal fees at certain central points; to require from student and teacher weekly reports of work done, and in some way obtain the assurance that the privileges accorded are being utilized to advantage.

5. The uniform adoption of such a system would do fully as much to attract good men to the service as the scheme now being tried, and would not be vitiated by the possibility of losing a certain number of newly commissioned officers soon after they had derived the maximum of benefit from special training.

6. Some of the special opportunities—not for promotion, pay, sinecures, pleasant duty, etc., but for professional work—should be available for those whose value to the Government is not a thing still to be determined, but one which has been demonstrated beyond question. A new man may prove temperamentally unfit for the Navy, though able to qualify by examination for a commission. The ultimate, permanent usefulness of every newly accepted candidate is largely a matter of conjecture. Time, labor, and money devoted to increasing his technical proficiency may prove to have been wholly thrown away.

7. It can not make for a solid, self-respecting, harmonious organization to train young men to be assistants and coworkers with older men of equal native capacity, energy, and ambition, if the latter, by force of circumstances beyond their control, gradually tend to professional inferiority to their juniors.

Certain stations, certain ships (e. g. the smaller ones), and recruiting duty afford but partial and limited scope for the exercise of professional talent and the man who, because of "the exigencies of the service," happens to have a succession of such assignments,

must inevitably drop behind professionally. Somebody has to have relatively poor duty; but, where patients are few and the field limited, it is manifestly impossible for the incumbent to acquire the highly eulogistic "record" that is now essential to promotion. Manifestly, the Government should do something toward the equalization of chances in these cases, and periodic four months' study-leave privileges, if utilized to the full, would do much to compensate for assignments to "poor duty."

8. The present scheme of giving special advantages to a few new and comparatively unknown men has merit, but it is one-sided. It is designed to create a number of specialists who will be expected also to do general naval medical work along with the specialty. This is very well, but it is not comprehensive, and only partially meets service needs. No lengthy argument is required to establish the importance of encouraging *all* medical officers to improve themselves professionally. What actually occurs is this: The man of 5 to 10 years' experience of naval requirements has an increasing amount of routine administrative work thrust upon him as the penalty of that experience, and his struggles to find time and opportunity for professional work are regarded as an effort to escape part of his duties; and a time finally comes when his ability actually is mainly administrative. Then the fact that he is not up to date professionally becomes a matter of reproach. It is perfectly clear that the young man unfamiliar with naval routine is of small help except at the actual bedside of a patient, and therefore his services for routine work can easily be spared; but it is a mistake not to make some provision for the older men, so that it will not be necessary to reply to legitimate requests, "Your application for permission to engage in special study is hereby acknowledged, but your services can not be spared at this time." These are the days of promotion for merit, and medical officers who have the merit of wanting to work up in their profession, and who if given the chance would improve it to the limit, should not be turned away with stereotyped *ex cathedra* phrases. There should be systematic provision for utilizing the energy and industry represented by bona fide requests not to become "specialists," and enjoy the prerogatives and advantages of the specialist, but to be better all-around Government servants.

The medical officer requesting duty at some large yard like Philadelphia, Washington, or New York on the ground that his wife's family and friends reside in the specified vicinity might then have to compete for the place with the medical officer who had devoted the first four months of his shore duty to a course of earnest study of sanitation and preventive and industrial medicine.

9. The Bureau of Steam Engineering, the Bureau of Yards and Docks, the Bureau of Construction and Repair have systemati-

cally sent members of their respective corps to technical schools for the acquisition of technical knowledge in special branches. Line officers of the Navy and Marine Corps are sent abroad from time to time to learn Chinese, Japanese, etc. The British Army has for years done the same. When one considers that many passages in medical books are obsolete after 10 years, and that almost every year for the past two decades has seen some startling, radical development in medical science, it would seem that after a three-year cruise or tour of foreign duty a chance to bring himself up to date is almost indispensable for the medical officer. If the proposition was put squarely up to the doctor's prospective patients, the vote for a study period could be safely predicted as unanimous.

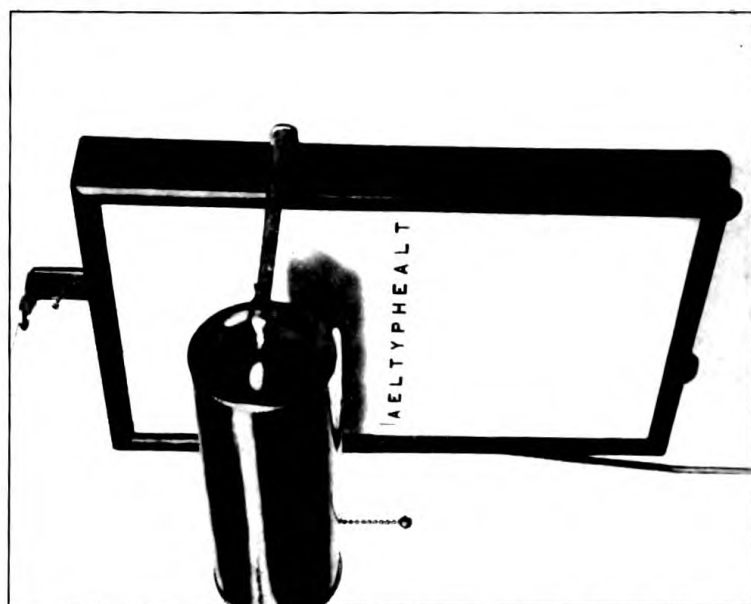
10. There is nothing like a cruise to reveal to a doctor his weaknesses and shortcomings. There are many situations ashore in which he can call in the specialist, refer to a laboratory, have the benefit of consultation with his betters; but alone on the "vasty deep" he is thrown wholly on his own resources, and he finishes his tour of sea duty with a clear realization of the various topics and subjects in which he needs to perfect himself. Every six months during the cruise he has been required to fill out a blank form stating what subjects he is most interested in and what subjects he desires special instruction in. But when he comes ashore and orders to a navy yard, hospital, or recruiting station are handed him "the opportunities for improvement" advertised as a feature of naval service are found to consist of more freedom from night calls and more leisure for reading in the evening than is available to his civilian colleague at the cost of seeing little of his family when the day's work is over. Incidentally the civilian colleague is not periodically separated from his family for months and years.

11. It may be objected that the result of this scheme would be to produce a dangerous class of elderly semispecialists, who would be constantly neglecting their administrative functions to "butt in" on the professional work of better qualified and younger men. To this there are several possible replies: (1) Usually the men who "butt in" do so from inborn proclivities, and they will be less and not more dangerous if they know something about the subject in hand; (2) the best administrator will usually be the one who in addition to a knowledge of regulations and procedure has the most general and real comprehension of all the work undertaken under his purview; (3) as long as military precedence obtains in the medical corps it would seem desirable for seniors in rank, even young ones, to have a maximum of knowledge about the fields in which their juniors are laboring; (4) a man should not be penalized for practical experience and general availability for service when he seeks to improve himself professionally. The young specialist may be a very dangerous crea-

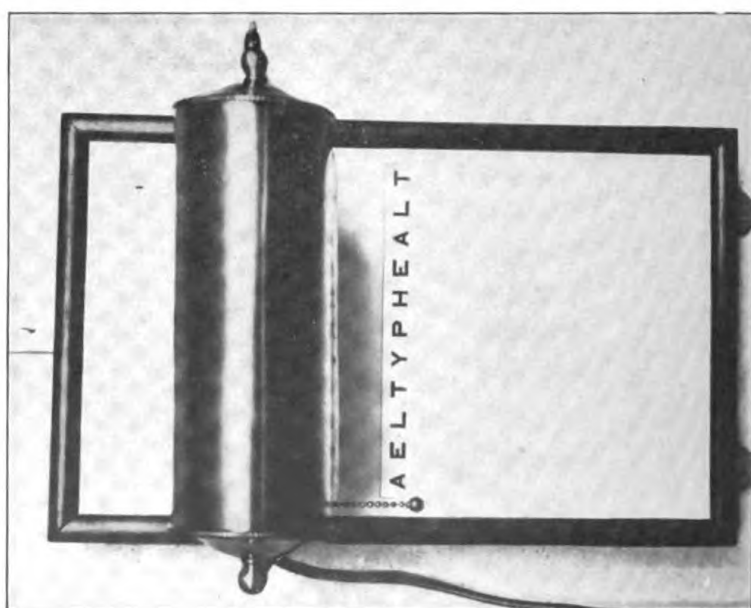
ture—particularly in a military service where specialists are few—and the possession by his immediate superiors of some knowledge of what he is about may have a most valuable guiding, even restraining effect; (5) it is not right to assume that the bulk of requests for special-study privileges will be confined to small fields. General medicine, diagnosis, genito-urinary diseases, sanitation, general surgery, can scarcely be regarded as specialties for the naval surgeon.

12. Again it may be objected that until the corps is considerably enlarged it will be a matter of great difficulty to provide reliefs for men who, so far as routine work is concerned, would temporarily be on an inactive status. Unquestionably there will be difficulty in providing reliefs for men assigned to study periods, but will the difficulty really be less with a numerically large than with a small personnel? When we get a large and adequate personnel it will not be for the purpose of assigning lighter and less engrossing work to a given individual, but to increase the scope and character of medical enterprise. With a larger personnel more will be undertaken, and the problem of securing time for individual improvement will remain or be intensified. The point to determine is, first of all, whether the scheme is meritorious; whether it is essential to progress and will give results commensurate with the task imposed on some detail officer. If it is meritorious and essential, a way can be found to put it into practice. All beginnings are hard if they are good ones. Only the trivial and unimportant things are easy of execution. When a medical officer is sick he gets hospital treatment or sick leave. The detail officer may be put to it to find a relief for him; other officers have added burdens to bear, but the needs of the sick man are met. There was a time when an officer on completing a full cruise was ordered to his home and had a month's leave, presumably to recuperate, set his affairs in order, etc., and get ready for shore duty. Let us revive and enlarge this provision for the good of all. The detail officer and the doctors whose labors are temporarily made heavier will benefit by it in their turn.

The editor hopes that he has accurately recalled and honestly and impartially reported the words of his interlocutor, but on second thought realizes that nothing in the conversation actually proved that previous editorials had been read.



Side view.



Vision test apparatus. Front view.

SUGGESTED DEVICES.

VISION-TEST APPARATUS.

By H. A. GILTNER, Lieutenant Commander, Medical Corps, United States Naval Reserve Force.

Three years ago the writer devised an apparatus for the vision test that has been constantly in use since that time and proved extremely satisfactory. It consists of a cabinet $15\frac{1}{2}$ by $9\frac{1}{2}$ by 2 inches, stained mahogany color, the front panel, containing the slot, being made of a thin plate of sheet steel enameled white.

The Grow test card is glued firmly to a board which slides vertically in grooves, which hold it close to the back of the steel panel, but yet not close enough to rub the surface of the card. The board, bearing the test card, is operated by means of a cord which passes through a metal bracket above and extends 20 feet or more from the apparatus, and is there attached to a screw eye in the wall. By pulling downward on the cord any desired line on the test card may be exposed, and when released the board carrying the card drops of its own weight and leaves none of the letters exposed, thus allowing no opportunity for memorizing.

The lighting is accomplished by means of a single Mazda lamp set in a chain-pull socket inclosed in a tubular brass reflector enameled white inside, the whole being attached to the cabinet by a bracket on each side. A set screw on the right allows the adjustment of the reflector to any angle. The whole apparatus is fastened to the wall by screws passing through metal brackets at top and bottom.

The advantages of the apparatus are: Its ease of operation by one person; its simplicity and impossibility of getting out of order; the card is always kept clean and out of sight except when in use; and the light is always uniform.

There is no uniformity at the various recruiting stations in the matter of lighting and using the vision-test card, and it is suggested that it would be advisable to have a standard apparatus, completely assembled, including light, which could be issued for general use. This device could be manufactured in quantities at a very low cost and would overcome the many disadvantages of the present methods in use.

The apparatus shown in the illustration was made at the Marine Corps carpenter shop, Washington, D. C., through the courtesy of First Lieutenant C. W. Henkel, U. S. M. C., post quartermaster, Marine Corps headquarters, and is a masterpiece in cabinetwork.

TREATMENT OF CEMENT FLOORS.

By A. FARENHOLT, Captain, Medical Corps, United States Navy.

The question of treatment of the raw cement floors of the toilets and wash rooms of the temporary ward buildings at the United States Naval Hospital, Mare Island, Calif., was for some time annoying. These floors became quickly stained in an irregular, parti-colored, and very unsightly manner. Various methods of cleaning, treatment, and surfacing failed to give a uniform, clean, or smart appearance. We believe the problem has been solved in the following manner: Floors and coves were scrubbed and wire brushed, and all traces of soap, powder, and lye washed out; the cement was allowed to dry; five coats of ordinary Navy "war color" paint were applied and each coat allowed to thoroughly dry. The result is a uniform color, a hard wearing surface, and a decidedly "smart" appearance. Heads so treated have stood up under hard usage for several weeks with very moderate wearing in paths. The worn places can be touched up when necessary.

CLINICAL NOTES.

TWO CASES OF OPHTHALMITIS IN SECONDARY SYPHILIS.

By W. H. WHITMORE, Lieutenant Commander, Medical Corps, United States Navy.

The following cases are reported because eye complications are comparatively rare in the very early stages of acquired syphilis:

CASE 1. D, H. I., private, U. S. M. C.; age, 23. Admitted January 23, 1920. Conjunctivitis. Patient says that for several days his left eye has been sore and that light hurts his eyes. The left eye shows scleral and conjunctival congestion. There is no hypopyon, no history of rheumatism. The patient denies any venereal disease. Urine is negative for sugar and albumin. Treatment: Twenty per cent argyrol; hot applications; shield over left eye; atropine, 1 per cent, 1 drop t. i. d.

January 29, 1920. No improvement in the condition of the eye. Both pupils are fully dilated. Vision: R. E., 18/20; L. E., 4/20. Ophthalmoscopic examination: R. E., normal; L. E., vitreous cloudy, with few floating opacities; retina seems congested, with slight edema of fundus. There are a few bright pin-point hemorrhages in the lower, outer quadrant, and a few small spots of exudate. The patient at this time admitted having had a sore on the penis about a month previous. There is a scar on the sulcus, and general glandular enlargement is present. Daily inunctions of mercury started. Hot compresses continued.

January 31, 1920. A faint macular rash is present on body and limbs.

February 1, 1920. Noguchi reaction positive.

February 2, 1920. Inunctions discontinued.

February 3, 1920. Salicylate of mercury, gr. 1 intramuscularly.

February 6, 1920. Arsphenamine, 0.6 gram intravenously.

February 9, 1920. Patient complains of pain in right eye. Right eye shows a deep subconjunctival congestion. Photophobia is marked. Vision: R. E., 6/20; L. E., 4/20. Ophthalmoscopic examination: R. E., slight cloudiness of vitreous. Retina is congested. No spots of hemorrhage or exudate seen. Shield applied over both eyes.

February 10, 1920. Salicylate of mercury, gr. 1 intramuscularly.

February 13, 1920. Arsphenamine, 0.6 gram intravenously.

February 16, 1920. Salicylate of mercury, gr. 1 intramuscularly.

February 20, 1920. Arsphenamine, 0.6 gram intravenously.

February 22, 1920. There is a decrease in the subconjunctival congestion of both eyes. Ophthalmoscopic examination shows no change since previous examination. Vision: R. E. 6/20, L. E. 8/20.

February 24, 1920. Salicylate of mercury, gr. 1 intramuscularly.

February 27, 1920. Arsphenamine, 0.6 gram intravenously.

February 28, 1920. Condition much improved. Vision: R. E. 14/20, L. E. 18/20. Ophthalmoscopic examination: R. E. and L. E.; vitreous clear, retina normal in appearance. Patient sent to duty.

March 2, 1920. Salicylate of mercury, gr. 1 intramuscularly.

March 5, 1920. Arsphenamine, 0.6 gram intravenously.

March 9, 1920. Salicylate of mercury, gr. 1 intramuscularly.

March 12, 1920. Arsphenamine, 0.6 gram intravenously.

March 3, 1920. Vision: R. E. 20/20, L. E. 20/20. Ophthalmoscopic examination: Both eyes, retina normal in appearance. Photophobia still noticeable. Mercurial treatment continued.

CASE 2. C, R. M. sergeant U. S. M. C. Age, 45. Admitted February 4, 1920, at an outpost, for reddened and painful eyes. Patient had noticed that light hurt his eyes about one week before admission.

February 7, 1920. Patient admitted to field hospital. Scleral and conjunctival congestion present, and photophobia marked in both eyes. Iris adherent in both eyes. Patient complains that there seems to be a veil in front of his eyes. Vision: R. E. 4/20, L. E. 2/20. Urine negative for albumin and sugar. There is a copper-colored macular rash on arms and body, and general glandular enlargement. Patient denies any venereal disease or sore. Admits having a sore on the tongue in the latter part of December, 1919. There is a scar on the dorsum of the tongue. Ordered atropine, 1 per cent, 1 drop in each eye t. i. d. Hot compresses.

February 11, 1920. Pupils not completely dilated. Vision: R. E. 4/20, L. E. 2/20. Ophthalmoscopic examination: R. E. slight haziness of vitreous; no perceptible change in retina, except slight congestion; L. E. anterior and posterior synechiæ; iris adherent to lens. Vitreous cloudy. Retina appears hazy and congested.

February 15, 1920. Noguchi test reported positive.

February 17, 1920. Salicylate of mercury, gr. 1 intramuscularly.

February 20, 1920. Arsphenamine, 0.6 gram intravenously.

February 21, 1920. Rash intensified.

The same course of treatment was followed as in case 1.

February 29, 1920. Congestion of both eyes decreased. Vision: R. E. 6/20, L. E. 10/20. Rash has disappeared.

March 8, 1920. Vision: R. E. 10/20, L. E. 10/20.

March 13, 1920. Vision: R. E. 16/20, L. E. 12/20. Ophthalmoscopic examination: R. E., lens clear, vitreous clear, retina normal in appearance; L. E., posterior synechia of lens, slight haziness of vitreous, retina clear.

March 27, 1920. Arsphenamine course completed. To continue mercurial treatment. Vision: R. E. 16/20, L. E. 12/20. Ophthalmoscopic examination same as on March 13, 1920.

In case 1 there seems to be complete recovery of function. In case 2 there will probably be a permanent impairment of vision on account of the posterior synechiæ of the left eye and because the case was not seen as early as case 1.

The serological work in these cases was done by Lieutenant W. Vann, Medical Corps, United States Navy.

A REPORT OF TWO CASES OF OPTIC ATROPHY.

By B. CAMERER, Lieutenant Commander, and G. L. McCLINTOCK, Lieutenant, Medical Corps, United States Navy.

These two cases are published to set forth how an apparently insignificant injury to the eye and its fossa can cause such disastrous effects to that organ. The exciting cause and the effect in these two cases received at the United States Naval Hospital, San Diego, Calif., within a short time of each other, are very impressive, and show that, no matter how slight the injury to the eye, it should receive earnest and early attention.

CASE No. 1. J. P. Z., electrician, third class, U. S. Navy. While fencing with foils without buttons, his opponent's foil entered the inner canthus of the left eye for a distance of approximately 3 cm. without injuring the eyeball itself. He felt a distinct grating of the foil on the bony roof of the orbit. The wound was sustained December 29, 1919, and he was admitted to the hospital on December 30. At that time he was totally blind in the left eye; the pupil did not react to light, but reacted on testing the right eye (consensual reaction). Convergent accommodation was present, but in about two weeks it had disappeared, and divergence of the injured eye became progressively marked. The left pupil was dilated and the optic disk showed a beginning optic atrophy, with a diminution in the size of the arteries, the veins being enlarged and tortuous. The optic atrophy progressed rapidly, and within three weeks presented a flat white disk, with distinct mottling of the lamina cribrosa, narrowed arteries, and enlarged and

tortuous veins. The scleral ring was distinct and slightly broadened. The rest of the eye ground was pale, but no other distinct changes existed. From the time of the accident, December 29, 1919, to the time of his discharge, April 20, 1920, he was totally blind in the left eye. There was at no time any exophthalmus, nor at any time, except immediately after the flesh wound, did he complain of pain in this eye. Approved treatment yielded no results.

CASE No. 2. C. R. B., baker, second class. Was the innocent bystander in a fight in the mess room. On February 15, 1920, a thrown kitchen fork struck him just at the roof of the left orbital fossa, in the midline, entering the fossa for a short distance; exact degree of penetration not known. Eye was treated and bandaged for a few days. On removal of the bandage he noticed the sight on the injured side was blurred. This gradually grew worse, and on admission to the hospital, on May 12, 1920, he could only see the Snellen type for 200 feet when he approached within 1 foot of it. He could distinguish light and dark and fingers at the same distance (1 foot). Reflexes were entirely lost in the left eye, but it reacted sluggishly when the reflexes of the right eye were tested. Convergent accommodation was entirely lost. Changes in field of vision could not be tested for obvious reasons. The nerve head was white in the center, with mottling of the lamina cribrosa very evident. The periphery of the disk was indistinct, and to a certain degree resembled the picture of choked disk, with very slight excavation of the physiological cup discernible. The vessels showed a slight narrowing of the arteries, with no evident change in the veins. The rest of the eye ground was negative. Slight exophthalmus, which was noted in the injured eye after healing of the flesh wound, did not occasion any pain. Approved treatment did not produce any alleviation of the symptoms. Condition of the eye remained stationary.

The etiological factor in these two cases was probably either a periostitis or a blood clot at or near the optic foramen pressing on the optic nerve. In the first case there was no exophthalmus, and in the second one it was of very slight degree, and has not subsided under treatment. X-ray plates showed no evidence of fracture in either instance. Prognosis in the first case is hopeless and in the second is very bad, and will probably progress to complete blindness. Both these patients were in good physical condition when injured, and both had negative Wassermann tests.

ARSPHENAMINE IN MALARIA.

By W. H. MICHAEL, Lieutenant Commander, Medical Corps, United States Navy.

The use of arspenamine in the treatment of many diseases has been reported with various results. In malaria, especially, there are many advocates of the use of arspenamine intravenously, and there are even some who are so optimistic in their faith in arspenamine that they class this drug as a specific comparable, if not even superior, to quinine in malaria.

At the field hospital, San Pedro de Macoris, Dominican Republic, there has been in use a satisfactory routine malaria treatment which has been followed by very few relapses. In this routine no arspenamine is used, but several patients happened to receive arspenamine additionally on account of some intercurrent disease. This coincident treatment demonstrated, I think, quite clearly the action of arspenamine in malaria. The three following case-history abstracts seem to illustrate the point:

CASE 1. Pvt. McC. Admitted May 24, 1919. Diagnosis, syphilis. May 26, 1919, Arspenamine, 0.6 gm. intravenously. On May 28, 1919, he developed malaria, which continued five days and was treated by quinine. June 4, 1919. Arspenamine, 0.6 gm. intravenously.

Then followed a long period, in which the patient suffered from frequent relapses of malaria and "used to take quinine whenever he got the fever."

Admitted April 15, 1920. Diagnosis, chancroid. April 16, 1920. Arspenamine, 0.6 gm. intravenously. April 18, 1920. Developed malaria with positive blood smear and was put on routine malaria treatment. April 23, 1920. Arspenamine, 0.6 gm. intravenously. May 8, 1920. Discharged to duty.

May 20, 1920. Malarial relapse; blood smear positive.

CASE 2. Pvt. McM. Admitted December 22, 1919. Diagnosis, malaria. Put on routine treatment. Was discharged from malaria treatment on January 6, 1920. January 12, 1920. Arspenamine, 0.6 gm. intravenously for chancroid. February 6, 1920. Malaria relapse; blood smear positive.

CASE 3. Pvt. O. Admitted, May 18, 1920. Diagnosis, chancroid. May 18, 1920. Arspenamine, 0.6 gm. intravenously. May 20, 1920, at 2 p. m. and just 48 hours after the arspenamine injection, he had an acute rise of temperature to 101.5 F., which returned at once to normal. A blood smear at that time was negative for malaria.

At 2 p. m. May 22, 1920, a blood smear was taken and a heavy tertian infection found. The temperature, which had been normal at noon, was now 102.8 F.

In the above case histories there were three occasions in which paroxysms of malaria were apparently precipitated by the injection of arsphenamine. This is probably accounted for by the fact that malaria is commonly brought out in patients having the disease by any procedure in which the body resistance is depressed. It is probable that the ordinary reaction following arsphenamine injection would be likely to bring out latent malaria, as there is always discomfort and usually vomiting, fever, and other signs of toxemia.

The first two case histories represent two-thirds of the cases of malaria which, in the eastern district of Santo Domingo, have relapsed to such an extent that they have been readmitted for the disease. It is not concluded that the administration of arsphenamine tends toward the production of relapses of malaria. The fact remains, however, that in a practically uniform routine malaria treatment which has effectively prevented relapse in by far the majority of cases, three cases did relapse, and two of these had received one or more full doses of arsphenamine in addition to the routine treatment. The third case actually developed malaria immediately after the injection of arsphenamine, though the patient had never had symptoms of the disease before.

The results in these cases seem to justify the opinion that arsphenamine administered in 0.6 gm. doses, intravenously, has no valuable specific action in the treatment of malaria, or the prevention of relapses in the disease.

A CASE OF URETERAL CALCULUS.

By W. J. ZALESKY, Commander, and P. F. PRIOLEAU, Lieutenant Commander, Medical Corps, United States Navy.

The case we are about to describe is a male, 49 years of age. Eight months ago he was operated on for appendiceal abscess. At the time of the operation the abscess had broken into the peritoneal cavity, and as the appendix was easily accessible it was removed and drainage provided. The patient recovered and returned to duty, but the wound continued to drain, and it was for this fecal fistula that he entered the United States Naval Hospital, Cavite, P. I., for the second time for surgical treatment.

His temperature on admission ranged from 99° to 101°. Severe chills were common, so that a malarial infection was suspected.

In a blood examination the leucocytes numbered 10,000, and polys amounted to 70 per cent. A urinalysis was as follows: Cloudy, sp. gr. 1.020, trace of albumin; no sugar. Microscopically many pus cells and a few erythrocytes were present, but no casts. Rather severe pains were complained of in the lumbar region below the left kidney. This pain was not paroxysmal in nature, but a steady, dull ache, which was fairly well limited to this area. Tenderness on deep pressure was elicited here and over the left iliac fossa. Pain and tenderness were not present on the right side. After a few days these symptoms disappeared only to return as before. It was found that in a 24-hour specimen 1,970 mls were excreted and contained only 9.85 grams of urea. This reduced nitrogenous output suggested renal involvement. After an injection of phenolsulphonphthalein, 1 mill, in the gluteal muscles, 22 per cent was recovered in the urine in the first hour and 28 per cent in the second. A culture from the urine was negative for Koch's bacillus, and a guinea pig was inoculated with urinary sediment without results. Tuberculosis of the kidney could, for all practical purposes, be ruled out. Many urine examinations were made and all showed a trace of albumin, many pus cells, and red blood cells. The urea content continued to be far below normal, sometimes only 7.5 grams being excreted.

The patient was cystoscoped, and it was discovered that a ureteral catheter passed easily into the right ureter, but after entering the left ureter it met an obstruction $2\frac{1}{2}$ inches above the ureteral orifice. X-ray examination showed the catheters in situ and the shadow of a large stone, 7 cm. from the vesico-ureteral orifices.

The diagnosis now being definitely ascertained, and believing the calculus to be of such size as to render its passage into the bladder impracticable, an operation was decided upon. The extraperitoneal route was chosen. The incision extended from a point about 1 inch internal to the anterior superior spine of the ilium, parallel to and above Poupart's ligament, and terminating not far from the external abdominal ring. Muscles were split and the peritoneum retracted. The ureter was identified by finding the bifurcation of the left common iliac artery, also its relation to the psoas muscle. Not far from the bifurcation of the artery was found the calculus, which was removed. It was brown in color and about the size of a large bean. The patency of the ureter was determined by passing a flexible metal probe in both directions. The ureter was repaired, drainage provided, and the wound closed. Recovery was uneventful. However, the patient's urine still contains a trace of albumin and a considerable number of pus cells, which, it is believed, will soon disappear. There are no erythrocytes present.

Close questioning of the patient revealed the fact that many years ago he had an attack similar to the one described. Probably the formation of the stone extended over quite a period of time. Calculi when situated in the lower portion of the ureter seldom cause the intense pain of renal colic, but, as here, the dull ache below the kidney. The left kidney did not apparently suffer from disuse, as now the urine contains a normal amount of urea in 24 hours. The phenolsulphonphthalein test shows 38 per cent excreted in the first hour, 46 per cent in the second, and 9 per cent in the third.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Captain J. S. TAYLOR, Medical Corps, United States Navy.
Lieutenant Commander LUCIUS W. JOHNSON, Medical Corps, United States Navy.
Lieutenant W. D. HORNER, Medical Corps, United States Navy.

GENERAL MEDICINE.

WOOD, H. C., JR. Principles of treatment of respiratory catarrhs. Penn. Med. Jour., May, 1920.

Dr. Wood insists that there is too much rule of thumb practice, too little understanding of the morbid processes involved, too much so-called "practical experience" to the neglect of a knowledge of pathology, in much of our treatment with resulting discredit to modern therapy.

In catarrhs of nose, throat, and bronchi a consideration of the etiology and the circulatory and secretory changes must be the basis of treatment. Many colds have a bacterial origin. For mechanical cleansing of the nose and throat the essential is a non-toxic solution isotonic with the blood and having some antiseptic action. He recommends 2 per cent boric acid solution, which may be flavored with rose or anise water.

Of greater germicidal power are dichloramin, phenol, and some of the volatile oils; menthol and eucalyptol are the favorites, though less active in this respect than oil of cloves and oil of sassafras; but oil of cloves is too irritating. These substances lose much of their power when dissolved in the true oils (olive or cotton seed), so the vehicle should be liquid petrolatum. Menthol has a desirable effect on the sensory nerves.

Local applications to the nose are of little value unless repeated hourly or oftener.

R	Ol. sassafras	.....	m	v
	Ol. menth. plp	.....	m	x
	Petrolat. liquid	.....	fl	℥ ij
R	Phenolls	.....	
	Mentholls	.....	
	Camphorae	.....	ãã	gr. v
	Petrolat. liquid	.....	fl	℥ i

647

Dr. Wood believes that various revulsant treatments, such as sweating and purging, are useful, though unable to explain how they act. He is equally diffident about explaining the rationale of quinine and hexamethylenamin, but believes they are useful in the treatment of acute catarrhs.

From the viewpoint of pathology, colds begin as an irritation of the sensory nerves, evidenced by discomfort and cough. Then come congestion and swelling of the mucous membranes. At first these membranes are dry; later they are bathed with serous fluid, not with a true secretion of the mucous glands, which only comes later as a thick muco-purulent discharge containing much dead organic material. The early congestion is a conservative process, and drugs which contract the vessels are contraindicated. A dry mucous membrane is brittle and easily injured, and its resistance to bacterial products is reduced. From this it follows that the aim of treatment should be—(1) to encourage moderate congestion; (2) to reestablish secretion; (3) to maintain moisture until secretion starts again. The first indication is best met by counter irritation and breathing warm air (mustard plaster and steam inhalations). In nasal colds, however, the pliability of the mucous membrane can be preserved by local applications of oily or aqueous solutions.

To increase bronchial secretion there are: (1) The depressants (aconite and the nitrites), but these are to be avoided for children; (2) the nauseants, of which ipecac is the best, but they are all deleterious to digestion, and therefore to be particularly avoided in treating children; (3) those causing hydremia, the best being citrate of potassium and citrate of sodium, acetate of ammonia, chloride of ammonia; (4) stimulants of secretion. Pilocarpin does this, but has other untoward effects.

Citrate of potassium is usually given in too small doses. It is safe to administer 1 grain every three hours for each 5 pounds of body weight.

When cough is excessive and unproductive heroin is the preferred opiate. The dose for an infant of 1 year is from one two-hundredths to one-hundredth grain.

In acute rhinitis, with thin, acrid, irritating discharge, the author uses locally, applied with a dropper, the following:

℞ One per cent phenol. liq.	m xv
Bismuth subcarb	3i-3ij
Glycerinl.	
Mucilage of acaciæ	
Peppermint water, each	℥i
	(J. S. T.)

GOETSCH, E. Epinephrin hypersensitiveness test in diagnosis of hyperthyroidism. Penna. Med. Jour., Vol. XXIII, No. 8, May, 1920, page 431.

Goetsch reports a clinical study of about 300 cases of thyroid disease with especial reference to the sensitiveness of these patients to hypodermic administration of epinephrin. He shows that in hyperthyroidism there is an increased constitutional sensitiveness to epinephrin and in hypothyroidism an increased tolerance for epinephrin hypodermically administered, and he indicates the practical application of this knowledge to the study, diagnosis, and treatment of thyroid disease.

In the thyroid gland, increased metabolism is a direct effect of oversecretion of the thyroid hormone, while some of the secondary effects result from the action of the hormone on the sympathetic nervous system, rendering this system more sensitive to epinephrin. This interreaction of the thyroid and adrenal secretions depends on the fact that whenever in an organism there is produced a change in the amount of circulating thyroid hormone, there results a change in the constitutional response to epinephrin—a drug which possesses a specific stimulating action on the sympathetic nerve terminations.

When the thyroid glands have been removed, cervical sympathetic stimulation or epinephrin injection does not produce an increase in the pressor response to epinephrin. It is justifiable to conclude that stimulation of the cervical sympathetic or epinephrin injection induces secretory activity in the thyroid gland, and that thyroid secretion renders more excitable the sympathetic structures acted on by epinephrin in raising arterial pressure.

Goetsch reasons that if thyroid secretion sensitizes the sympathetic nerve endings to the action of epinephrin, it is reasonable to suppose that a sudden increase of epinephrin in the circulating blood should call forth active responses throughout the domain of distribution of the sympathetic nervous system. This result he has found to be remarkably constant. His first patient exhibiting hyperthyroidism, a case of exophthalmic goiter, gave a sharp reaction to the injection of epinephrin, and since that time he has carried out the test in 300 cases of thyroid disease and approximately 100 cases simulating hyperthyroidism.

The test is carried out as follows: The patient, especially if a nervous individual, should preferably be put to rest for a day previously. If the patient is disturbed by outside factors, there is a psychic reaction, accompanied by increased pulse rate, increased blood pressure, and subjective and objective symptoms resembling those that follow injection of epinephrin. The normal must be established before the test is carried out. Two or three readings are taken, at five-minute intervals, of the blood pressure, systolic and

diastolic, pulse rate, and respiration. The readings should be fairly constant; if not, time should be allowed for the patient to become quite calm. The subjective nervous manifestations should be noted; throbbing of the precordium, abdominal aorta, or peripheral large arteries; heat and cold sensations or asthenia; pallor and flushing of the hands and face; the size of the pupils; temperature of the hands and feet; perspiration, etc. The presence or absence of these is noted previous to the injection so that comparison may be made afterward. A hypodermic syringe with a fine needle is used to inject subcutaneously 0.5 c. c. of the commercial 1:1000 solution of adrenalin chlorid, which should be fresh. Readings of the pulse, blood pressure, and respirations, and any changes in the subjective and objective manifestations are then noted every $2\frac{1}{2}$ minutes for 10 minutes, then every 5 minutes up to 1 hour, and then every 10 minutes for half an hour longer.

In the positive reactions there is an early rise in systolic and a fall in diastolic blood pressure. In a very mild reaction the fall in diastolic pressure may occur alone. In the course of 30 to 35 minutes there is a moderate fall of the pulse and blood pressure, then a characteristic secondary slight rise and a second fall to the normal in about one and a half hours. One also sees an exaggeration of the clinical picture of hyperthyroidism, especially the nervous symptoms. There is often increased tremor, apprehension, throbbing, asthenia. Vasomotor changes are common, such as early pallor followed in 30 minutes to an hour by flushing, sweating, and warmth of the face, hands, and feet. The respirations become slower and deeper, later more shallow and rapid. These symptoms have never been dangerous.

A normal person shows no reaction whatever, or a very slight one. Exophthalmic goiter cases show a uniformly positive reaction, which is remarkably parallel in its manifestations with the severity of the symptoms in the case. But in the advanced cases the reaction which one might expect to be very marked may be only mild, because the nervous system, heart, and other organs have been so severely damaged by the thyroid intoxication that they are unable to respond to the epinephrin. In cases of colloid goiter without symptoms of hyperthyroidism the reaction is negative. In cases of adenoma the reaction is positive and in proportion to the severity of the symptoms. If the adenoma has become degenerated and lost its activity, the reaction is nearly or entirely negative.

The test has proved of value in differential diagnosis of conditions simulating hyperthyroidism, especially incipient tuberculosis, but also psychasthenia, psychoneurosis, hysteria, dementia precox, alcoholism, acromegaly, arteriosclerosis, and other conditions. Cases of this kind give negative results.

A very definite preoperative epinephrin response becomes mild and even imperceptible in many cases very soon after operation, particularly in the adenoma cases. Exophthalmic goiters show a change in the reaction after operation paralleling the improvement of the symptoms. Generally speaking, in cases of exophthalmic goiter a certain degree of hypersensitiveness tends to persist longer than in cases of excision of adenomata. (L. W. J.)

WALSH, E. F., and O'HARE, J. P. A nephritic diet sheet. *Am. Jour. Med. Sc.*, June, 1920.

In this sheet the ordinary articles of diet have been divided into three groups: The patient is instructed that whatever foods or dishes (in the current bill of fare where he happens to be) he may wish to eat he must first find on the sheet and take only in quantities designated as full or half portions. He is told that if the article is found in Group I a full portion counts 1 in the score for the day; if it is found in Group II, it counts 2; he must keep count and "make" the total score prescribed for him. Now, the quantity of each article given on the sheet as a full portion contains approximately 4 grams of protein in Group I and 8 grams in Group II. We divide the number of grams of protein we wish the patient to have in a day by 4, and the result is the figure we must write in (in the blank space left for the purpose) to represent what his daily score should be. The protein in the portions in Group II is, of course, twice as much as that contained in those of Group I; therefore a portion or helping of a food listed in Group II scores 2, while those of Group I count but 1. Group III lists foods of so low a protein content as to be negligible. It goes without saying that foods not found on our sheet may be easily added to it. The foodstuffs listed have been selected and grouped merely on the basis of the protein content. We doubt that any of these foods are specially harmful to the kidneys. If any should be found so, they may be removed.

Finally, this scheme, as will be readily apparent, is based essentially on the diet chart published years ago by Arnold, which, in the opinion of the writers, should have met with a more general use than, so far as they know, has been the case.¹ It was Arnold's great merit to point out that uniform amounts of protein can be taken by common measures in quantities of food which are about what one would naturally take as a serving. Arnold's charts, however, as we think anyone who has used them will agree, are of more service to the physician than to the patient. The scheme submitted herewith makes the data available as a guide for the patient and the physician.

¹ Arnold, H. D.: *Boston Med. and Surg. Jour.*, 1909, cixl, 457. *Medical Communication*, Massachusetts Medical Society, 1909, xxi, 631. *Tr. Am. Climat. Assn.*, Philadelphia, 1909, xxv, 128.

NEPHRITIC DIET SHEET.

Any combination of the foods listed below may be selected.

Foods not listed below must not be taken.

In Groups I and II there is a restriction in the total amount.

The foods in these groups must be served in full or half portions.

A full portion in Group I counts 1.

A full portion in Group II counts 2.

In Group III the quantity of each is not restricted, although you are urged to use discretion.

Your total score for the day should be ———.

Your total amount of fluid should be ——— pints.

Do not add salt or spices to the food after it has been cooked.

GROUP I.—EACH FULL PORTION COUNTS 1.

	Full portion.		Full portion.
Bread (white).....	1 average slice.	Vegetables, etc.:	
Bread (Graham).....	1 average slice.	Baked beans.....	1 tablespoonful.
Uneda biscuit.....	5 crackers.	Lima beans.....	1½ tablespoonfuls.
Shredded wheat.....	1 biscuit.	Potato, creamed (P. B. B.).....	1 tablespoonful.
CEREALS.		Potato, mashed (P. B. B.).....	1½ tablespoonful.
Oatmeal.....	2 tablespoonfuls.	Potato, boiled....	1½ med. tablespoonfuls.
Boiled rice.....	3 tablespoonfuls.	Green peas.....	2 tablespoonfuls.
Corn-meal mush....	4 tablespoonfuls.	Canned corn.....	2½ tablespoonfuls.
Cream of wheat....	6 tablespoonfuls.	Onion, boiled.....	3 tablespoonfuls.
Farina.....	6 tablespoonfuls.	Macaroni.....	4½ tablespoonfuls.
		Squash, boiled....	5 tablespoonfuls.

GROUP II.—EACH FULL PORTION COUNTS 2.

Milk.....	1 glass.	Meats:	
Egg.....	1 egg.	Chicken, roast.....	3" x 3" x 1".
Eggs (scrambled).....	1½ tablespoonfuls.	Lamb chop, broiled	¾ chop.
Custard (P. B. B.).....	3 tablespoonfuls.	Lamb, roast.....	3" x 2½" x 1".
Fish:		Beef, roast.....	3" x 2" x 1".
Cod, boiled.....	1" x 1½".	Beef steak, broiled.	2" x 1" x 1".
Haddock, boiled...	1½" x 1" x 1".		
Oysters.....	7 oysters.		

GROUP III.—NO RESTRICTION.

<i>Vegetables.</i>	<i>Fruit.</i>	<i>Miscellaneous.</i>
Turnips.	Watermelon.	Sugar.
Carrots.	Plums.	Sirup.
Cabbage.	Pears.	Candy.
String beans.	Peaches.	Honey.
Cucumbers.	Strawberries.	Maple sugar.
Cauliflower.	Grapes.	Butter.
Celery.	Raspberries.	Cornstarch.
Tomato (fresh).	Blueberries.	Arrowroot.
Tomato (cooked).	Muskmelon.	Tapioca.
Lettuce.	Apple.	Post Toasties.
Asparagus.	Pineapple.	Maple sirup.
	Prunes.	Olive oil.
	Apple sauce.	
	Orange.	
	Grapefruit.	

(J. S. T.)

STRATHY, G. S., SMITH, C. H. V., and HANNAH, B. **Delayed arsenical poisoning.** *Lancet*, London, April 10, 1920.

Under this heading the author reports 58 cases of poisoning following administration of "606," which were investigated when unfortunate results began to be noted in connection with a system of intensive treatment for syphilis which had operated satisfactorily in the British army until the autumn of 1917. Of the 58 cases here reported 8 were sudden in onset and terminated fatally in a few days. In the remainder the symptoms developed less rapidly and varied in severity, and recovery took place.

In the fatal cases the greatest number of salvarsan administrations was 11, the lowest 4. The largest total amount given so far as could be ascertained was 6.95 grammes, the smallest 2.2 grammes. The average interval between last dose and first symptoms was 41 days. The longest interval was 48, the shortest 18 days. The average period of illness was 5 days, the shortest 2, the longest 11 days. One patient was under 20 years of age, four were between 20 and 30, three between 30 and 40. All had identical symptoms, namely, jaundice followed by nausea, epigastric pain, stupor, hematemesis, and delirium, ending in death. In four cases the delirium was violent. The patient who lived 11 days after the development of symptoms had a gradually developing and ever deepening drowsiness. In all the cases whose urine was tested bile was present; in nearly all there was albumin. The hemoglobin and red cells showed but slight reduction. The white cells varied from 14,000 to 24,000. The polymorphonuclears ranged from 50 to 80 per cent.

In the nonfatal cases the greatest number of salvarsan doses administered was 14, the least was 2. The longest interval between

the last dose and the appearance of symptoms was 180 days, the shortest 3 days. Three patients were under 20; 30 between 20 and 30; 17 between 30 and 50 years of age. Jaundice led to admission to the sick list in 39 cases, dermatitis in 8, nephritis in 2, general debility in 1. Blood pressure was generally low. Frequently it was normal and never above 140 mm. Examination of the urine showed albuminuria in 28, bile salts in 35, increase of bile pigment in 16 cases. Leucin and tyrosin were never present. All the patients gave a negative Wassermann except 2, who had strongly positive reaction.

After an analysis of the character of the jaundice, a reference to two cases which developed peripheral neuritis, a description of the eruption, which was papulo-erythematous with desquamation, and a report of a typical necropsy in a fatal case, the authors take up the question of etiology. They hold that the essential factor in the untoward results is not the benzol group in the salvarsan, but the arsenic, and point to the fact that manifestations of disturbance in liver, skin, peripheral nerves, and stomach corresponded to those seen in arsenical poisoning by Fowler's solution. Neither the age of the patients nor the primary disease had any bearing on the phenomena developed. None of the cases were treated with the original German preparation. Some substitute, such as neo-kharsivan, galyl, or novarsenobillon, was employed. The available records do not permit of precision here. The poisoning is ascribed to injudicious dosage and lack of adequate preliminary physical and urinary examination. The authors believe that the fault was with the administration and not with the preparation or composition of the remedy. As in all cases intramuscular doses of mercury were given contemporaneously with the arsenic treatment, the irritating effects of mercury on the kidney undoubtedly contributed to the results described. The authors hold that this simultaneous exhibition of mercury and arsenic constitutes a real menace to the patient.

It is held that fatalities may be avoided during a course of salvarsan treatment by careful examination before and after each administration to determine any albuminuria, dermatitis, and bile excretion. The X-ray should be used to determine commencing atrophy of the liver, which may precede other symptoms.

When the symptoms come on suddenly, with stupor and vomiting, the prognosis is unfavorable. Slow recovery may be expected when symptoms are delayed and slow in developing. A common feature of convalescence is a reduction in bile, with consequent clay-colored stools, etc.

In the fatal cases purgatives, morphia, and bicarbonate of soda were given. In the milder cases regulation of diet was enforced. The food ingested was much reduced. Patients received 30 ounces of skimmed milk daily, and to this was gradually added bread and

jam—high carbohydrate and low fat content. Tea and coffee were allowed. Absolute rest in bed was required. There was little loss of weight in the patients. Vomiting stopped when food was reduced. Sodii bicarbonatas 3ii was given every 24 hours. The inquiries conducted in connection with the jaundice outbreak showed that in the main the actual technique of salvarsan administration had been correct, but there had been distinct neglect in the matter of preliminary physical and urinary examinations. After the originally prescribed routine was put into force by special orders, no more fatal cases came to the notice of the authors.

An interesting feature of the paper is the emphasis laid on the value of X-ray examination of the liver, with the patient standing up to determine atrophy of the liver. (J. S. T.)

SURGERY.

ARNOLD, A. Open treatment of fractures. *Am. Jour. Surg.*, Vol. XXXIV, No. 3, March, 1920, page 87.

Arnold does not approve of indiscriminate operating on simple fractures, where good apposition and function can be secured by the closed method. Any overriding, displacement, shortening, or malposition should be corrected by the open method if it can not be accomplished otherwise.

The open method should be used where there is considerable displacement of fragments that can not be otherwise corrected; where complete reduction can not be secured by manipulation; where manipulation causes undue trauma to other structures; where there are spiculæ of loose bone or soft tissue between the fragments; where the fragments are rotated and can not be maintained in proper position; in spiral and multiple fractures; where fractures involve nerves or blood vessels; in ununited fractures and vicious union; in fractures complicated by dislocation and in close proximity to joints; in all fractures of the femur not in perfect anatomical apposition. In all these lesions the results will be far better by open operation than by trying to reduce and maintain the fragments by manipulation and external fixation, provided the surgeon is experienced in bone work, has modern instruments, and perfect asepsis can be secured.

The most striking contraindications for operation on broken bones are inexperience on the part of the surgeon, unsuitable surroundings, and insufficient equipment.

In noninfected fractures operation should be performed within five or six hours after injury. X-ray examination is essential to determine the type and position of the fracture. If a patient is

seen after 24 hours and there is considerable damage to the soft parts, he advises waiting 10 or 15 days, or until the tissues have resumed a more normal condition, before operating.

Plates should be used in preference to grafting in the presence of infection, where there is great strain on the bone at the site of the fracture, and in some of the larger bones where time is important. Do not operate with a tourniquet applied, lest an overlooked vessel begin bleeding, with resulting hematoma. The plates should be removed as soon as the bones are sufficiently united to prevent displacement, usually within 8 to 10 weeks. (L. W. J.)

ESTES, W. L. Treatment of crushed extremities. Am. Jour. Surg., Vol. XXXIV, No. 3, March, 1920. Page 69.

The first effect of a crush is usually shock. The immediate shock is frequently out of all proportion to the extent and severity of the injury, because in many instances it is psychic shock. Hemorrhage is rarely serious immediately after a crush, because of the shock and because the vessels are squeezed and ground asunder. This presses the severed coats of the vessels together and in the weakness of shock this prevents immediately serious hemorrhage. Later, however, hemorrhage may be severe. The absence of hemorrhage soon after these injuries has led physicians into the grievous error of neglecting measures to control bleeding.

The management of crushed extremities comprises the following:

The control of hemorrhage.

Treatment of shock.

Disinfection and immunizing.

Treatment of the injury.

Measures to restore function and usefulness.

The control of hemorrhage should be the special care of the person who renders first aid, and it is the first indication for treatment. Bleeding after reaction takes place should be forestalled by proper means during the period of shock. If a tourniquet is used, it should be applied over the injured tissues above the severed vessels, just as near the wound as it may be placed to be secure. If a splint is necessary, the tourniquet may be applied over the splint just above the bleeding vessels.

The key to shock is the blood pressure. No serious operative procedure should be taken after a serious crush if the systolic blood pressure is below 80 mm. One should content himself with control of hemorrhage and the careful application of an antiseptic dressing. Then put the patient to bed; apply heat externally; give a warm normal salt hypodermoclysis, 500 c. c., with 10 to 15 c. c. of 1:1,000

solution of epinephrin hydrochloride. Intravenous injection is to be done only by a very skillful man who understands the technic of administration, and who knows the indications for continuing or discontinuing it. The operation may be delayed as long as 40 hours with benefit to the patient, and a much better chance of recovery, provided serious sepsis does not occur.

Most careful efforts to obtain physical cleanliness should be employed. For greasy, sooty wounds benzine or spirits of turpentine should be used around the wound. Then wash with green soap and sterile water and disinfect with Dakin's solution. Iodine should not be used when soap and water have just been applied. It will not penetrate, but will be very irritating. The excision of all devitalized tissue or tissue which will surely necrose is not to be neglected; also the removal of all foreign matter is necessary to obtain primary healing and prevent suppuration.

The enthusiastic acceptance of the Carrell-Dakin method of treating infected wounds by most of the American surgeons who worked at or near the front in the late war, and its very general employment at present in civil practice, make one hesitate to recommend any other method in preference to this most efficient treatment. Comminuted wounds are especially adapted to this method.

The question of amputation will be a pressing one in many of the cases. Annular crushes, where all of the tissues of the limb have been crushed through the whole of a limited transverse section of the limb, require amputation. When the soft tissues under the skin as well as the bone have been comminuted, even though the skin may not be badly lacerated, an amputation will be required. If the bone be comminuted for a distance of 6 cm., and the soft tissues immediately above the bone badly lacerated, one should amputate. Extensive longitudinal and oblique lacerations admit of conservative treatment, while circular ones require amputation. Extensive muscular lacerations should receive less consideration than great injury to an extensive area of skin. Compound fractures which sever a large nerve trunk do not require primary amputation; conservatism is always to be tried. The nerve may be sutured if necessary. Doubtful conservative attempts in cases of very seriously crushed limbs have a larger percentage of mortality than have amputations. The first sign of gas bacillus or streptococcal infection in the doubtful cases should determine immediate amputation and open treatment of the stump.

After more than 20 years' experience in plating compound fractures, which are always infected, he does not consider that an infected wound is a contraindication to the use of a bone plate in compound fractures. (L. W. J.)

PHILLIPS, A. B. *Nerve injuries of the war.* Jour. Iowa State Med. Soc., Vol. X, No. 4, April, 1920.

A series of 224 cases showed the following to be the most frequent involvement: Ulnar, 63 cases; musculospiral, 57; median, 47; musculocutaneous, 10; internal cutaneous, 8; brachial plexus, 6; great sciatic, 27; peroneal, 25; long saphenous, 5.

The time of operation should be three months after the wound is completely healed. The operation should be commenced under local anesthesia and completed under gas-oxygen after the patient begins to complain of discomfort. Extensive scar tissue is a great obstacle in these cases, as the nerve must be completely freed from the scar tissue by very painstaking dissection. After it is freed the nerve must be prevented from lying next to the scar. A bed for the nerve may be prepared by splitting a muscle or by placing it between two muscles; as a last resort a fat-fascia transplant may be used, placed between the nerve and the scar tissue, but not around the nerve unless the nerve is completely surrounded by scar tissue. The nerve will be found with its ends completely apart, or else there will be a neuroma at the point of injury, which is the equivalent of a complete severance. The neuroma should be removed and the ends brought together in as nearly normal position as possible. Fine silk sutures through the sheath are used to hold the ends in position. If the separation of the nerve ends is very great, a nerve transplant may be used, the lower portion of the musculocutaneous of the leg is suitable for this purpose. (L. W. J.)

ORR, T. G. *Treatment of war amputated.* Jour. Kansas Med. Soc., Vol. XX, No. 4, April, 1920, page 92.

With an estimated number of 400,000 amputated among the casualties of the war, it brings this subject very prominently before the medical profession.

The surgeon appreciates more than ever before that cooperation with the artificial-limb maker is necessary for the best results. The problem of making the patient fit the artificial limb is to be as carefully considered as making the artificial limb fit the patient.

All possible parts of the hand should be saved. If but one finger or thumb is left it can be made very useful by fitting the hand with one artificial finger to aid in grasping and picking up objects, or a hook can be used in conjunction with one finger or thumb. Amputations through the wrist joint do not make good stumps because the styloid processes are apt to become tender from pressure. A laced socket, which is an inconvenience, is required, because the stump is larger at the end than above the wrist and a fitted artificial hand will hang lower than the opposite normal hand. Amputation just

above the wrist gives a stump that will retain pronation and supination, but is very apt to become atrophic and cyanosed and produce discomfort. For a good working arm the best site for amputation is at the junction of the middle and lower thirds. Three inches of ulna are required for successful fitting of the upper forearm; if shorter than 3 inches the biceps tendon tends to push the bucket off the stump when the elbow is flexed. An amputation through the elbow is objectionable because the condyles are liable to become tender; the laced socket is inconvenient; the joint is wide and unsightly. A long upper arm is preferable to a short forearm. The best arm stump is produced by amputation just above the humeral condyles. A stump less than 3 inches long below the axillary fold is not useful as a lever in an artificial arm. An artificial appliance with a shoulder cap can be successfully fitted to very short arms and disarticulations at the shoulder. Fitting at the shoulder is made easier by leaving the humeral head to fill the glenoid fossa.

The situation in the lower extremity is much different from that in the upper—weight bearing and locomotion are the two factors to be considered. A single toe is usually troublesome and should not be left. Amputation through the metatarsals anterior to the insertions of the peronei and tibiales may make a very useful foot. At the ankle, of the classical operations of Pirigoff, Chopart, and Syme, the latter is the only one of practical value. A good Syme can be fitted, but probably with no more satisfaction than an amputation at the junction of the middle and lower thirds of the leg. A 7 or 8 inch leg stump is the choice between the knee and the ankle. A leg stump as short as 2 inches can be used, but with little leverage. The old site of election, 4 inches below the knee, is now obsolete. The longer the thigh stump the better, providing the femoral condyles are not included. A thigh stump less than 3 inches long, measured from the pubes, has very little fitting value; amputation through the neck of the femur or disarticulation is preferable. (L. W. J.)

HYGIENE AND SANITATION.

ARNOULD, E. *Disinfection of tubercular sputum.* Presse med., April 3, 1920.

Careful disinfection of the sputum of tuberculous patients is apt to be neglected because sputum is often scant in those who are only suspected of the disease; because the presence of the bacillus is not always determined in one or two examinations; because reliance is improperly placed on the attenuation of the virulence of the germ when placed under unfavorable conditions. Hence attendants and nurses may deem it quite sufficient to empty sputum cups in water-closets and drains, though experiment has proved that the germ

remains active even after several months sojourn in river water and drains and on the surface of water in irrigated ditches, etc.

Exposure to boiling water or steam for 15 minutes suffices to destroy the tubercle bacillus, and the action is increased by adding 15 per cent of sodium carbonate to the water. In the home the use of steam and boiling water is not a simple and practical matter, the kitchen and kitchen utensils not furnishing the appropriate place or instruments for these procedures. The same is true of direct incineration by fire (paper spit cups may be destroyed in the cellar furnace in winter). In the home chemical disinfection is the ideal one. The author reviews the history of the subject. The essentials demanded are promptness of action and capacity to dissolve or liquefy sputum so as to quickly reach bacilli imbedded in plugs and droplets of thick sputum. Vincent's experiments seemed to prove that exposure of sputum to a 10 per cent solution of soda lye disinfects sputum in 6 hours, but other investigations have not confirmed this. Soda solutions apparently do not kill the bacillus and favor the development of the organisms of putrefaction. Dr. Arnould recommends the following mixture, due to Küss, Roepke, and Geillinger:

Soft (potash) soap.....	8 grammes.
Crystals of sodium carbonate.....	10 grammes.
Formol (30 per cent).....	40 grammes.
Water to make.....	1,000

The preparation is almost without odor, inexpensive, easily handled, facilitates the later cleansing of the receptacle and liquefies sputum. It is therefore the ideal disinfectant at present.

STOKES, J. H., and BREHMER, H. E. Syphilis in railroad employees. Jour. Industrial Hyg., Vol. 1, January, 1920.

Attention has been called in the literature from time to time to the menace of syphilis of the central nervous system to the safety of the public, particularly when it takes the form of paresis and epileptiform seizures in men responsible for the operating of trains.

The 50 railroad employees whose cases were considered included locomotive engineers, firemen, brakemen, switchmen, conductors (excluding dining car), section hands, yard foremen, inspectors, telegraph operators, signal maintainers, and station agents. Men of types, aside from the responsibilities which devolve on them, form an especially interesting occupational group, medically speaking, because they have for years been ostensibly under medical surveillance, and their health record is, therefore, in a sense indicative of the efficiency of the industrial medical practice of the past. To find so high a percentage of the men infected with a grave disease, capable

of seriously impairing their efficiency, and, through that impairment, of bringing discredit on railroad administration and danger to the public is a matter of concern. To find so much of the infection easily recognizable, and yet apparently unrecognized, suggests the need for a modern revision of methods and conceptions in medical supervision.

The blood Wassermann reaction, the first great objective diagnostic earmark of syphilis in the general medical examination, was strongly positive in only 43 per cent of our series. Four per cent were weakly positive. Fifty-three per cent of the cases were completely Wassermann negative on the blood. There is nothing in this group to controvert the idea that Wassermans taken on younger men (all but 8 of our cases were more than 32) would yield a higher percentage of positive results if not obscured by treatment. There is much in these figures to discourage an uncritical reliance on the negative blood Wassermann as evidence of the absence of late syphilis.

The examination of the spinal fluid proved of more value than did that of the blood in the detection of syphilis in this group. Such an examination was made in only 33 of the 50 men, but should, we are now convinced, have been made in all of them. Nearly two-thirds (64 per cent) had fluids positive on some one of the four points of the examination (increased globulin alone was not accepted as evidence), as contrasted with 47 per cent positive on the blood.

The cerebro-spinal fluid findings did not parallel the symptomatology in degree, nor did the symptoms necessarily suggest involvement of the nervous system. Men were accordingly found to be actively at work on engines and in other responsible positions whose cell counts ranged as high as 139.

The purely laboratory procedures contributed 58.7 per cent of the diagnoses. The remaining 41.3 per cent were identified by the methods of routine physical examination. Among these the recognition of pupillary abnormalities and fundus changes in the eye, the signs of cardiovascular involvement, and the neurologic changes stood out preeminently.

Of 39 men, adequately examined from every standpoint that modern knowledge could suggest, 79.5 per cent had syphilis of the nervous system, 18.7 per cent had cardiovascular syphilis. The two co-existed in some cases. Some of the cardiovascular cases were not subjected to spinal puncture, although there is no doubt in our minds at the present time that puncture should have been done.

Cardiovascular abnormalities were recognizable as valvular lesions, aortitis, myocardial changes, and their sequelæ in 18.7 per cent.

Pupillary abnormalities, muscular paralyses, and fundus changes proved to be among the most significant and valuable of signs, being

present in 62.5 per cent of the cases. The eye findings are classified as follows:

	Per cent.	Cases.
"Slow" reflexes.....	25	48
Argyll-Robertson pupils.....	37	48
Unequal pupils.....	14.5	48
Irregular pupils.....	14.5	48
Muscular paralyses.....	12.5	48
Fundus changes.....	26.5	34

The presence of so high a percentage of abnormal eyes in a group of men whose eyes, of all structures in their bodies, are ostensibly subject to the keenest scrutiny by railroad medical examiners, was a matter for astonishment. The inadequacies of the average railroad medical eye examination, which seems to be confined to vision and color sense and the remedial possibilities, suggest themselves at once. At least a clue to the presence of two-thirds of the syphilis we recognized in railroad men could have been had by so simple a procedure as the careful taking of pupillary reflexes.

Even an extremely simple neurologic examination, such as should properly be a part of any significant medical examination, revealed interesting facts. Omitting the details of the complete neurologic studies made on many of the cases the gross findings are:

	Per cent.	Cases.
Abnormal knee reflexes.....	65.1	43
Abnormal Achilles reflexes.....	78.1	32
Positive Romberg.....	38	39
Speech defect.....	15.7	38
Mental symptoms (diminished attention, irritability, amnesic attacks, etc.).....	38.4	39
Bladder involvement (cord, bladder, retention, incontinence, etc.).....	47.5	40
Ataxia.....	36.8	38
Paresthesias.....	55.8	34
Hemiplegia.....	7.1	42
Loss of consciousness.....	7.1	42

The high percentage of mental symptoms is especially interesting. Two patients had amnesic attacks, and it was apparently in one of these that one of the locomotive engineers in our series became responsible for a breach of orders, running past a siding with a resulting collision of his freight with a passenger train. Many of the men were irritable, quarrelsome, inattentive, or fuddled. One patient, a locomotive engineer in charge of a very large and powerful engine, subsequently described vividly his impulses to run engine,

train, and all through the terminal station building, and the subsidence of this dangerous irritability following the beginning of treatment. The records of these patients were taken before this study was contemplated and by another department, so that they are reasonably free from subjective interpretations. (L. W. J.)

TROPICAL DISEASES.

GOODMAN, H. *Ulcerating granuloma of the pudenda.* Arch. Dermat. and Syph. Feb., 1920.

Lieutenant Pederson, Medical Corps, United States Navy, has seen three cases in St. Thomas, Virgin Islands; Dr. Gehringer, one in Panama; Dr. Pardo, one in Havana. The affection involves skin and mucous membranes and is peculiar to the Tropics. It is a chronic, infectious, indurated growth attacking the genitalia or neighboring parts of either sex. There is no involvement of the glands or serious impairment of health.

The essential feature of the disease is a round cell infiltration in the upper corium, which extends into the papillæ and also downward into the subcutaneous layer. The main mass lies in the upper layer of the cutis. As the disease progresses the papillæ increase in size, the interpapillary processes become elongated, and the result is a complicated arrangement of columns of epithelial cells and dense exudation of round cells of mesoblastic origin. Connective tissue gradually disappears from the corium, being replaced by the infiltrating mass. Elastic tissue fibers become swollen and break up. There is no tendency to caseation or suppuration. The cells of the rete malpighii become swollen and their protoplasm more hyaline. Division of cells and nuclei takes place. The corium is raised in the form of a small tumor, with stretching of the epithelium. Leucocytes invade the summits of the tumors. In spite of the stretching and thinning of the epithelium its complete disappearance over the tumors is rare, but in some cases ulceration occurs, with dense scar tissue formation.

The disease has not been successfully reproduced in animals as those inoculated died. Most authorities are in agreement that ulcerating granuloma and syphilis are separate pathological entities, though venereal ulcers may furnish the infection atrium for the granuloma. The disease is mildly contagious and probably transmitted by coitus. The period of incubation is from 4 to 8 days. Clinically the masses are light red, shiny granulations that bleed easily. They are largest at the margins and sunken in the center. A thin, sanguineous fluid of fetid odor exudes from the tumors. This secretion varies greatly in amount. When scant the granulations

are covered with scabs. There may be cicatrization at one place and disintegration at another. The healing may have a shrivelled, firm, raised, hairless cicatriceal tissue.

While the lymph glands are not enlarged the lymph channels may be blocked and a pseudo-elephantiasis may result in fistulas, strictures, etc., but unless vagina, rectum, or urethra are involved there is little or no pain.

The disease is of great chronicity, and complete, spontaneous cure rarely or never occurs. The absence of glandular involvement and the history, distinguish it from the initial lesion, and the superficial and vascular character of the growth distinguish it from the gumma of syphilis. In yaws there are multiple lesions. Absence of metastasis, the youth of the patient, the lack of cachexia, exclude malignant disease.

Treatment is by tartar emetic orally and intravenously, by excision, Roentgen rays, and the actual cautery.

A personal survey of 12,000 men and 900 women disclosed but four cases. In three of them the *calimobacterium granulomatis* was demonstrated. (J. S. T.)

EYE, EAR, NOSE, AND THROAT.

UNGER, M. Frontal sinus drainage. Am. Jour. Surg., Vol. XXXIV, No. 5, May, 1920, page 124.

From questionnaires sent to representative nose and throat specialists, Unger obtains the following figures: 52.5 per cent of frontal sinusitis cases are acute; 47.5 per cent are chronic; 3 per cent of acute cases become chronic.

Unger thinks that the chronic cases develop from those where symptoms are mild or of short duration, so as to be disregarded by the patients, or cases receiving treatment only for relief of the acute symptoms, the most important of which is pain.

Three factors prevent proper drainage from the frontal sinus. These are: Swelling of the nasal mucosa, hypertrophied middle turbinates, polyps.

Cocain and adrenalin have only transient effect, and ordinarily do not reach the whole extent of the fronto-nasal opening. Unger advocates introducing into the frontal sinus rubber or fabric drainage tubes through the natural openings.

Linen, silk, or rubber catheters, sizes 4 to 10 French, are used and are inserted by threading over a properly curved probe, which has previously been passed into the sinus to determine the size and direction of the fronto-nasal duct, with or without resection of the middle turbinate. Catheters are first cut $3\frac{1}{2}$ inches long, which allows a part

to project from the nose and aids in withdrawing the probe from the catheter. The tubes are left in place for one or two days, then withdrawn and replaced by others. The advantages are that there is minimum destruction of nasal mucosa; the catheter resists encroachment of swollen nasal mucosa; blocking by polyps is prevented.

(W. D. H.)

Deaths and poisoning from local anesthetics in throat surgery. Editorial, Am. Jour. Surg., May, 1920.

The report of a special committee in the section of laryngology during the last meeting of the American Medical Association is discussed.

This committee planned to give a comparison of local anesthesia and its effects with those of general narcosis, and to study the toxicity, the matter of idiosyncrasy, and the relative merits of cocain and the various synthetic preparations.

A questionnaire disclosed many toxic effects. Twenty deaths were recorded. Two fatalities occurred following operations on the nose, one resulting from injection of a weak solution of procain into the septum and the other from injection of a 10 per cent solution of cocain into the nose by mistake.

Deaths occurred in 18 throat cases; 12 after cocain, 5 after novocain, and 1 after procain. Five of the cocain deaths were due to avoidable mistakes by druggists or attendants. Adrenalin was not considered as a factor. The cocain deaths are not considered remarkable, because cocain is much more generally used than any of the synthetic compounds. No satisfactory substitute for cocain in topical application has been established.

Toxic effects, short of fatality, were noted from cocain, novocain, eapothesine, beta-eucain, and stovain. Where drug idiosyncrasy is suspected preliminary trials of the drug in small doses is recommended. Edema and sloughing followed the use of quinine and urea hydrochlorid. One writer who recorded 390 tonsillectomies with this anesthetic now states that he has not used it for two years, although no publication has been made retracting his former advocacy of it.

Local anesthesia is the method of choice for intranasal operations in America. In throat operations it is preferred by the majority of American laryngologists. Neither the toxic effects nor the occasional fatalities from its use are more dangerous or more numerous than the corresponding hazards of general narcosis. One observer reported 37 deaths from the nitrous-oxid combination, the "safest" anesthetic.

The committee stated that synthetically prepared anesthetics may be freely injected if it is done slowly and in proper dosage; that the greatest danger lies in entering a vein or rapid injection; that fatalities occur immediately or not at all; that the drug is eliminated via the liver; that a peculiar susceptibility does exist in some individuals. The committee suggests that all operations be performed with the patient recumbent from the first application of the anesthetic; that each operation be preceded by the usual hypodermic injection of morphin and atropin; that the patient be not allowed to leave the hospital immediately after the operation. (W. D. H.)

TIECK, G. J. E. Correction of deformities of the nose. *Am. Jour. Surg.*, Vol. XXXIV, No. 5, May, 1920, page 117.

Tieck gives the technic and shows the results obtained in over 1,000 cases treated in the last 12 years. He emphasizes the general lack of serious attention given to the development of this branch of surgery. Scientific correction of deformed noses is worthy of the surgeon's best efforts, as facial appearance plays an important part in business and social success.

The deformities usually encountered are the hook or bent nose, the saddle nose, the laterally deviated or bent nose, and the long nose. All of these are amenable to correction except saddle nose, due to syphilis, which the author has not attempted.

Contraindications to operation are sinus disease, eustachian tube, or middle-ear infections and old age.

Anesthesia is obtained by local painting with 10 per cent cocain and 1 to 1,000 epinephrin solution in the submucous operation and by the injection of the following solution:

Sol. cocain hydrochloride, 10 per cent.....	gtt. XV
Solution epinephrin, 1 to 1,000.....	gtt. XXX
Sterile water.....	oz. III

This mixture is injected subcutaneously over the bridge of the nose and laterally over the cartilages, well out over the maxillary bones.

Iodin is applied to the inner aspects of the alæ and over the cutaneous area of nose and cheeks.

The operative procedure is divided into two stages, consisting of (1) the exposure and (2) the correction or reconstruction. The exposure is practically the same in all cases.

Four intranasal incisions are usually required in each nasal fossa to obtain the necessary separation of skin and periosteum from the bone, but in some cases only two of these are necessary.

The first incision is made along the border of the pyriform opening of the nose. Beginning at the lower end of the nasal bone, it is carried downward and outward through the mucous membrane and chondro-osseous junction. An elevator is passed through this incision and insinuated between the periosteum overlying the nasal and maxillary bones and swept laterally and mesially, lifting off the periosteum, subcutaneous tissue, and skin from the bone. The entire area extending from the root of the nose laterally over the nasal bones and superior maxilla is so liberated.

The second incision is made parallel to the bridge of the nose. Beginning at the lower end of the nasal bone, it is carried downward and forward along the anterior edge of the bony and cartilaginous septum to the tip of the nose. This incision is carried through the cartilage up to the perichondrium overlying the bridge of the nose, then by careful dissection the perichondrium and soft tissues over the bridge of the nose and lateral cartilages are separated from the underlying bony and cartilaginous septum and lateral cartilages. At this stage one should be able to sweep the elevator freely over the bridge of the nose from roots to tip and laterally well out over the cheeks in the artificial space created between perichondrium and cartilage. Emphasis is laid on completely freeing these tissues in order to prevent formation of wrinkles or dimples as healing takes place.

A third incision is made from one nostril to the other. Beginning at the end of the second incision at the tip of the nose it is carried backward along the lower border of the quadrilateral cartilage to the nasal crest of the superior maxillary bone. This incision passes through mucous membrane and cartilage.

A fourth incision is made through the lower lateral cartilage at the point where the cartilage bends upon itself. This incision divides the lower lateral cartilage into an internal and an external part. The last two incisions are necessary to permit the requisite exposure for plastic work on the septum and cartilages.

Methods in typical cases are as follows: Correction of hook-shaped deformity consists of leveling the hump off the nasal bones at their junction and trimming the protruding bony and cartilaginous septum with scissors. The skin is molded and placed in position. If the nose should appear too broad after the removal of the hump, the remaining part of the nasal bones with the frontal processes of the maxillary bones are forced over and bent inward to the desired position and held by internal and external splints.

Shortening of the nose is accomplished by the resection of a triangular piece of cartilage, together with its perichondrium and mucosa, from the lower part of the quadrilateral cartilage, the base

of the triangle being along the anterior border of the septum, the apex at the nasal crest of the superior maxilla. The lower part of the nose is then elevated and the edges of the wound sutured.

The size of the tip is reduced by resecting a crescent-shaped piece of cartilage from the tip on each side and then suturing the wound edges. The alæ nasi are reduced in size by resecting a crescent-shaped piece of cartilage from each wing.

Lateral deviation is corrected by forcing the nose sideways into the median line after resecting the upper end of the anterior part of the bony septum situated in front of and below the cribriform plate of the ethmoid. This precludes the possibility of fracture of the ethmoid plate. The nasal bones and frontal processes of the superior are now dislocated and forced into the median line.

Saddle nose is corrected by elevating the nasal bone and filling the defect with a transplant of the middle or inferior turbinate. The nasal bones are completely detached from the frontal processes of the superior maxilla and the frontal bone and then elevated sufficiently to raise the bridge to the desired height. The piece of turbinate, properly shaped and denuded of mucosa, but not its periosteum, is placed between the anterior edge of the bony septum and the nasal bones. Gauze is inserted into the nasal cavities to hold the graft in position, and in two days it is firmly attached and within three weeks is organized and firm. The middle turbinate is usually large enough to fill in the defect, but the lower one may be used.

Postoperative edema occurs in nearly all cases, but is controlled by cold compresses. Continuous improvement may be expected for six months.

Out of 100 transplants only 5 broke down. In two of these infection was caused by a chronic ethmoiditis. Out of 780 cases of hook nose 10 became infected with resultant periostitis, but were relieved by proper drainage without interfering with the cosmetic result. He emphasizes the importance of experience to determine just how much bone to remove or replace and to master the necessary details of technique. (W. D. H.)

NOTES AND COMMENTS.

The American Library Association, an organization of 40 years' standing, which during the war put more than 7,000,000 books into circulation for the use of the Army, Navy, and Marine Corps, is raising a fund of \$2,000,000 to continue its educational campaign. The home office of the association is 24 West Thirty-ninth Street, New York.

According to the census of 1910, there were then more than 180,000 persons in hospitals for the insane and more than 20,000 persons in institutions for the feeble-minded in the United States, the aggregate cost to the country of the insane alone being estimated at about \$160,000,000 annually. Of 84,000 persons confined in almshouses, 43,000 were mentally incapacitated to some extent, and there were at least 30,000 persons with some mental disability or disease among the 136,000 inmates of prisons, workhouses, and institutions for juvenile delinquents.

Tea taster's cough.—Dr. A. Castellani, in a recent address on the relation of the higher fungi to human pathology, delivered before the Royal College of Physicians, London, gave an interesting account of a case of chronic bronchitis in an assistant in one of the big Ceylon tea firms. A number of medical men had diagnosed tuberculosis, but the patient informed the author that he merely had "tea taster's cough." Dr. Castellani admits that he had never heard of such a malady before. Physical examination revealed nothing but a few coarse râles in the chest, and the sputum was negative for bacillus tuberculosis. It contained, however, some mycelial filaments and yeastlike bodies:

Tea tasters not only taste infusions, but often fill their hands with tea leaves and bury their noses in them and snuff them up. A certain amount of dust is thus inhaled. The tea dust of Ceylon constantly contains fungi of the genus *Monilia*, frequently contains those of *Aspergillus* and *Penicillium*, and sometimes the fungi of *Oidium* genera. A peculiar streptococcus also occurs. These organisms are not rarely found in the nasal cavities of tea tasters and in their bronchial secretions when they have a cough.

Somewhat similar affirmations may be made about workers in tea factories. When these workers develop a cough, lose weight and strength from inhalation of dust, they must leave the factory and go to the country, when the symptoms gradually disappear.

D. H. Colcorn, writing in the *Scientific American* for June 12, 1920, on the scientific basis of carelessness, makes the very interesting suggestion that habit, which we are wont to regard as so vital to efficiency and secondarily to safety, is often the cause of serious accidents, particularly in industrial life, so that it is to skill developed from long practice, to a highly developed muscle sense and to celerity of reflexes instead of carelessness that we should really ascribe the so-called accidents leading to maiming and loss of life. The author says:

"Did you ever start to change your collar before dinner and find that you had, from force of habit, removed several other articles of apparel before your attention was arrested? Have you ever gone to the bathroom for a drink of water to find yourself a moment later with a razor in your hand? You can find any number of instances from these suggestions wherein daily you perform some act deliberately and find yourself in the midst of a second or third act that has by habit accompanied the first. A prominent industrial surgeon told me that occasionally men burned themselves with apparent deliberation, the movement that produced the injury being a unit in a habit series. A man operating the levers of a crane, pouring a heat, oiling a lathe in motion, driving an automobile, or crossing a crowded thoroughfare, may at a dangerous moment continue to act as accustomed by habit, thus occupying the nervous machinery with habit chains which prevents conscious control. The more highly skilled a workman becomes the more liable he is to such a lapse of attention accompanied by unconscious activity.

"A correct analysis of the neurotic state of the injured at the time of the action would charge the responsibility to *skill* rather than to *carelessness*. The man has relegated to the lower brain centers control of the thousands of acts that function in series. The automatic connection that is made between separate acts in serial action sets in, and, although valuable as skill, may prove to be his undoing in an emergency. To perform one act touches off the series. Animals are not careless; they are always at attention, being unencumbered with automatic complex muscular coordinations.

"* * * For instance, one sees that a steel cylinder has been cut to the mark on a milling machine; an arm moves to stop the carriage; the movement of the arm muscle stimulates the muscular sense which 'touches off' a leg movement to kick open a switch to

stop the motor; the kick sets up a nervous transmission that moves the arms to release the piece of steel, etc. This repeated a hundred times becomes automatic, habitual, unconscious—the sixth or muscular sense furnishing the connecting links. It is then easy to conceive of a number of situations where men have been injured due to an extra uncontrollable movement in a habit series.

“* * * To allow a man to work too long at one machine with one series of actions jeopardizes his safety. He becomes a slave to habitual coordinations. Safety-first signs must be changed frequently in design and effectiveness.”

In the April issue of *Social Hygiene* the first paper under the caption “Note and Comment” is entitled “The case against the prophylactic packet,” and a very strong and able arraignment it is.

We have no brief for the prophylactic packet and indeed incline to believe that its issue in the service or employment elsewhere is a doubtful expedient and perhaps unjustifiable on moral grounds. There is certainly a radical difference, from the ethical standpoint, between administering relief to the self-confessed wrongdoer in an effort to minimize the results of an act which may have followed a real but unsuccessful struggle to be virtuous and the open advocacy of measures which, to the unthinking majority, seem to guarantee immunity from the consequences of a certain line of conduct, to condone it, to accept it as inevitable.

We do insist, however, on historical accuracy and believe that the strongest argument is always somewhat invalidated by a carelessness of statement in the premises. This leaves loopholes for attack by those of contrary mind and discredits the credibility of the defender of a proposition. Such inaccuracy is always peculiarly regrettable in the printed page and diminishes the authority and prestige of a standard publication.

It is stated on page 308 that “in the American army and navy” the prophylactic packet “was considered of too little value to be officially recognized as a factor in the general program for combating the venereal diseases.”

So far as the American Navy is concerned we beg to submit that this presentation of the case is not in accord with the facts. Up to and even after December, 1913, the sentiment of the medical officers of the Navy was favorable to the prophylactic packet. On February 27, 1915, the Honorable Secretary of the Navy promulgated a letter to all commanding officers of the Navy in which he discussed the subject of venereal diseases and clearly and fully set forth his views in regard to ordinary preventive measures (par. 7), and in regard to the prophylactic packet (pars. 8, 9, and 10), the use of the

latter being unreservedly condemned without reference to its possible value, but on moral grounds and on moral grounds only. If a measure is unjustifiable on moral grounds it may safely be thrown aside, and there is no occasion to discuss what its intrinsic merits might be if it did not violate a principle. The letter in question, of course, settled the matter for the Navy.

The United States Public Health Service, which has for some time been conducting investigations in regard to the treatment of leprosy, announces unusually good results from the use of an ethyl ester of chaulmoogra oil containing that drug's essential principles and appropriate for continued administration. Very gratifying success has attended the employment of this preparation in 48 lepers treated with it for one year. Further reports are awaited with interest.

The Rockefeller Foundation has announced its purpose of providing an endowment to produce an income of £30,000 for the purpose of providing sound and thorough medical training as a basis for more effective work in disease prevention and disease control throughout the world. Regarding London as the natural center for such effort in Europe its University College and hospital school will be the seat of the proposed work, and the immediate building program includes an institute of anatomy, a new home for nurses, quarters for resident physicians, a biochemical laboratory, additional wards, a new obstetric ward, etc., so as to bring the total bed accommodation up to 500. It is expected that the buildings will be completed and the educational plans in full operation by 1923.

A \$3,000,000 home is to be erected for the Army and Navy Club of America, 18 Gramercy Park, New York, of which Rear Admiral Bradley A. Fiske, United States Navy (retired), is president. Besides all the usual features of a modern club the building will contain a special court or hall as a memorial to the officers who died during the recent war. In it will be preserved photographs, autographs, letters, souvenirs, and trophies of all kinds pertaining to the deceased. Civilians will be eligible to associate membership.

The Navy Mutual Aid Association is fortunate in having as its new secretary and treasurer Rear Admiral T. J. Cowie, Supply Corps, United States Navy, whose ability as an organizer and financier has

long been recognized and was very conspicuously demonstrated throughout the war.

At a meeting of the board of directors held June 16, 1920, it was decided that, under section 1, Article VIII, of the by-laws of the association, temporary and reserve officers on active duty are eligible for membership if under 45 years of age.

Since its organization the Navy Mutual Aid Association has paid to officers' beneficiaries over \$2,379,000. The cost of insurance up to the age of 25 (on average up to 29) is less than present Government rates, and from 40 on is less than Government insurance at the new rates on conversion.

The members of the faculty of the University of Virginia, after contributing on an average more than \$100 apiece toward raising an emergency fund to increase the laboratory and other facilities for first-year medical students, are appealing to alumni and friends of the university to give financial support to this undertaking. Because of the limited income of the institution at this time it will be necessary, unless outside aid is forthcoming, to turn away from 20 to 40 fully prepared applicants for matriculation in next year's class.

A new medical quarterly is the *Annals of Medicine*, whose first issue is dated April 1, 1920. It is published by W. F. Prior Co., of New York, N. Y., and Hagerstown, Md. This periodical is the official organ of the American Congress in Internal Medicine and of the American College of Physicians. Dr. Frank Smithies, of Chicago, is the supervising editor.

About two-thirds of the reading matter in this first number are devoted to reviews of current literature. The very interesting leading article, by Dr. R. W. Wilcox, defines the field of internal medicine. We do not go so far as to challenge the statements that "disease received earlier attention than injury"; that "Oliver Wendell Holmes coined the word 'anesthesia'"; and that "medicine has made modern surgery possible"; but suggest that these postulates would make excellent topics for a medical debating society.

The *Modern Hospital* (Vol. XIV, No. 6) reports that the Children's Hospital of Boston is the first institution in America to make use of double convex lenses to intensify the rays of the sun for therapeutic purposes. Rollier, of Switzerland, has for years conducted a sanitarium for solar therapy, where practically the entire

body of the patient is exposed to the sun's rays. The French method recently adopted in Boston is to employ large biconvex lenses of 12 inches diameter, with a focal length of 72 inches. The part to be treated must be at least half this distance away from the lens to prevent injury. There will then be a circle of light from 3 to 5 inches in diameter. The lens is held in a cylindrical frame of wood and wire covered with some white material, the whole slung from a tripod rigged over the bed in such a way that the rays may be tangential to the surface to be treated. Treatments should be brief at first, but gradually the period of exposure may be increased from 5 to 30 minutes. Old sinuses, suppurating wounds, tubercular glands, lupus of recent origin are among the ailments benefited by solar-ray treatment.

Subcutaneous injection of novarsenobenzol has been employed for five years by Dr. A. Poulard, who briefly outlines his technique in *La Presse Médicale* for June 9, 1920. The necessary outfit consists of a glass syringe of 1 to 2 c. cm. capacity; a needle 3 cm. long; an ampoule containing 15 centigrammes of novarsenobenzol; an ampoule containing 1 c. cm. of 1 per cent novocaine solution. The novocaine solution is added to the novarsenobenzol, which is dissolved in a minute or two.

The injection is made into the subcutaneous cellular tissue of the buttock, and not into the muscle, the needle being held vertical to the surface. It can be repeated daily or every second day, according to the effect desired. Dr. Poulard claims that his patients are able to go to work after the treatment, and so far he has not had a single local or general complication.

The United States Public Health Service estimates that in the United States there is at least one rat for every person, and that the depredations of this rodent cost not less than half a cent a day for each one, making a total loss from this source of \$180,000,000 a year. Even without the menace of plague, as a purely economic and business proposition, rat extermination should be prosecuted with vigor. The English bull terrier, the fox terrier, and other rat-killing dogs are worth their keep if only as a valuable aid in reducing the rat pest.

Prof. Charles S. Banks, writing in the *Philippine Journal of Science*, Volume XX, No. 3, describes the swarming of anopheline and culex mosquitoes witnessed by him, and calls attention to the fact

that this interesting phenomenon sometimes took place when a wind was blowing at from 12 to 15 kilometers an hour. He declares that it is a mistake to think that mosquitoes are too frail to withstand any but the mildest breeze, for in the Philippines they are able to fly against a stiff wind, or at least to maintain themselves in it with safety.

We learn from the British Medical Journal (May 22, 1920) that Dr. J. S. S. Logie, a native of Kirkwall, Orkney, celebrated the centenary anniversary of his birth on May 11, and join with other colleagues in extending to him felicitations on his attainment, in health and happiness, to this advanced age.

Dr. Logie graduated at Edinburgh in 1842, at the age of 20. His diploma bears, among others, the signatures of Prof. James Syme and Sir James Y. Simpson. He was one of the earliest followers of Simpson in the use of chloroform anesthesia.

The official medical publication of the French Navy (Arch. de Med. et Phar. Nav.) for May, 1920, contains an interesting account of the conversion of the cadet training school-ship *Duguay-Trouin* into a hospital ship at the beginning of the war and her service up to the time of transfer from the English Channel to the Mediterranean.

W. F. McKenna and H. A. Fisher, writing in Surg. Gyn. and Obstet., April 20, 1920, report experiments from which they conclude that potassium-mercuric-iodide 1:100 in acetone, or in 70 per cent alcohol, is more efficient than the official tincture of iodine for purposes of skin disinfection preliminary to surgical operations.

The Monthly Labor Review for February, 1920,¹ gives the following list of industries in which dermatitis of one form or another is liable to attack the employee:

Industry.	Trade processes.
Aniline dyes.	
Automobile and parts.....	Machine shopping (oil).
Bakelite.	
Boots and shoes.....	Glossing and blackening.
Boxes, fancy and paper.....	Paper-box making (glue).
Brass and bronze products.....	Acid dipping.

¹ Published by U. S. Dept. of Labor, Bureau of Labor Statistics.

Industry.	Trade processes.
Clothing and textiles.....	Cleaning, dyeing.
Cordage, twine, jute.....	Combing, stranding (oil).
Dry cleaning and dyeing.....	Dyeing and cleaning.
Electric apparatus, etc.....	Pitching dry batteries.
Enameling and japanning.....	Enameling.
Foundry and machine-shop products.....	Welding, electroplating.
Furniture and cabinets.....	Polishing and veneering.
Glass manufacturing.....	Mixing ingredients (arsenic); decorating (benzine).
Halowax.	
Iron and steel mills.....	Galvanizing (sal ammoniac).
Lime manufacturing.....	Grinding, slaking.
Marble and stone.....	Surfacing (oxalic acid).
Oilcloth and linoleum.....	Mixing ingredients.
Paint and varnish manufacturing.....	Cleaning with benzine, manufacture varnish.
Paper and roofing paper.....	Sizing with alum.
Rubber goods.....	Specialty work, making inner tubes, cold cure.
Soap.....	Handling soap.
Stereotyping and electrotyping.....	Tending batteries.
Stoves and furnaces.....	Metal cleaning (naphtha).
Toys and games.....	Brazing.

H. A. Mount, writing in the *Scientific American* for April 24, 1920, estimates the total amount of pure radium in the world at about 5 ounces, valued at \$120,000 a gram. The uses of radium are practically limited to surgery and to rendering luminous the surfaces of watches and the dials of certain instruments and apparatus. Less than one-third of an ounce of radium has sufficed to treat 4,000,000 watches and clocks.

America is the principal source of radium and Colorado the chief field for mining it in the United States. As by-products of the refining process uranium and vanadium are obtained.

Luminous paint is made from zinc sulphide or zinc in the form of crystals, which, when very pure, glow under the influence of radium.

A bill has recently been introduced in the New York State Legislature and has passed the senate calling for an appropriation of \$250,000 to be used by the State Institute for the Study of Malignant Disease for the purchase and use of radium.

EPITAPH OF OBIZUS.

(A twelfth century physician who taught in Paris before the establishment of any regular school.)

Respice qui transis, et quid sis disce vel unde,
Quod fulmus nunc es, quod sumus istud eris.
Pauper canonicus de divite factus Obizo
Huic dedit ecclesiæ plurima, seque Deo :
Summus erat medicus, mors sola triumphat in illo,
Cujus adhuc legem nemo cavere potest.
Non potuit medicus sibi met conferre salutem.
Huic igitur medico sit medicina Deus.

Look back you passer-by and see
Whence you have come and what you'll be.
As we have been so you are now,
And what we are you'll be, I trow.
Obizus, rich at first, became
A canon, poor in all but fame.
His wealth unto this church he gave,
Himself to God, his soul to save.
A rare physician, he had skill
To conquer all but Death, whose will
Over the doctor triumphs yet.
No remedy could he beget
His own existence to assure.
God give him healing evermore.

REPORTS.

THE DANGERS OF ARSENICAL PREPARATIONS USED INTRAVENOUSLY.¹

By E. S. BOGERT, Captain, Medical Corps, United States Navy.

In preparing and using arsenical solutions intravenously for anti-syphilitic medication it should be an unvarying practice to follow the specific directions accompanying a given product and sample.

It would seem from the information at hand that trouble encountered with arsphenamines may be due to a number of possible causes, grouped as: (A) Possible causes incident to manufacture, and (B) possible causes incident to the preparation and administration of the solution.

(A) Possible causes incident to manufacture.—

1. Isomerism.
2. Bacterial decomposition products in arsphenamines.
3. Abnormal toxicity of arsphenamines due to decomposition of the arsphenamine in the tube where it may have been exposed to the heat of a flame in sealing.
4. The presence of metallic arsenates in arsphenamines due to contact with exposed metal parts of apparatus during manufacture.

(B) Possible causes incident to the preparation and administration of arsphenamines.—

1. Conflicting and ambiguous directions issued by manufacturers with their arsphenamines.
2. "Under-alkalinization" of the solution, due to using litmus paper or the phenomenon of "clearing" of solution as a criterion of proper "alkalinization" instead of adding alkali in definite molecular proportions to form the di-sodium salt.
3. "Old" distilled water containing bacterial decomposition products.
4. Water containing heavy metals, calcium, and magnesium salts.
5. Impure sodium chloride used for preparing salt solution, with which some operators dilute arsphenamine solutions.
6. Increased toxicity engendered by the use of hot water in making solutions of arsphenamine.

¹ Abstracted from a confidential report of investigations conducted at the U. S. Naval Medical Supply Depot, Brooklyn, N. Y., to the Bureau of Medicine and Surgery.

7. An erroneous belief on the part of some practitioners that arsphenamine must be administered at body temperature, which leads them to warm arsphenamine solutions and to keep them warm by leaving them in sterilizers, etc., while the patients are being prepared.

8. Exposing the "alkalinized" solution to the action of air for too long a period before administration, as occurs when a large number of doses are prepared at one time in a clinic.

9. Administering arsphenamine in too concentrated a solution. The danger in administering concentrated solutions has been repeatedly referred to in medical literature. Solutions "alkalinized" 1 to 100 were found to show about twice the amount of visible decomposition evidenced by those "alkalinized" 1 to 200 and exposed to the air under the same conditions. But still more important is the fact that a slight excess of alkali would be of little consequence if well diluted, and that the less concentrated the solution the less would the causticity of the excess alkali be.

10. Too rapid a rate of administration. United States Public Health Service Bureau Circular Letter No. 163 states: "It is believed that excessive rapidity of administration accounts for more unfavorable results in the use of arsphenamine than any other one thing."

Conflicting and ambiguous directions issued with the various arsphenamines are apt to produce very unfortunate results. For instance, dissolving arsenobenzol in hot water *may* increase its toxicity, but it certainly does not make the solution dangerously toxic, as it seems that when properly alkalinized, this brand of arsphenamine, even though dissolved in hot water, meets the toxicity tests of the hygienic laboratory.

As stated before, there is no change in the color which would denote that hot water influences arsenobenzol chemically, and that in this respect it differs from the other arsphenamines.

Practitioners generally know that arsphenamine is a definite chemical compound. After using a large amount of any particular brand of arsphenamine the practitioner finds it unnecessary to consult the directions; the preparation of the solution has become a routine matter. If he happens to procure another brand of arsphenamine it will probably not occur to him that the directions with the new brand might be different from those with the old brand, simply because it is fixed in his mind that arsphenamine is a definite chemical compound, manufactured under license from the Federal Trade Commission and controlled by the hygienic laboratory.

The four American brands of arsphenamine seem to differ considerably in chemical and physical characteristics. Their molecular arrangements are probably not identical. As delivered to the medical officers of the Navy they are in a sense unfinished remedial products, in as much as they must be dissolved and alkalinized, and the avoid-

ance of unsatisfactory results depends largely on the technique of administration.

The question of whether or not methyl alcohol exists as an impurity in the English and American preparations to the extent of perhaps one-half to 1 per cent is now being investigated at the laboratory of the United States Naval Medical Supply Depot, Brooklyn, N. Y.

A recent paper on the chemo-therapy of organic arsenical preparations by Dr. C. N. Meyers states that the mono-sodium salt of arsphenamine is very unstable and easily precipitated by carbon dioxide, phosphates, and blood proteins. Experiments conducted at the United States Naval Medical Supply Depot, Brooklyn, N. Y., confirm the observation regarding the action of blood proteins, *in vitro*, at least.

THE PREVALENCE OF VENEREAL DISEASE IN THE DOMINICAN REPUBLIC.

By J. W. VANN, and B. GROESBECK, Lieutenants, Medical Corps, United States Navy.

The newcomer to Santo Domingo is struck by the opinion held both by laymen and native doctors that "everybody in the country has or has had a venereal disease." If he desires to verify this opinion, he will find himself against a stone wall, as far as statistics are concerned, for there are no vital statistics of any kind.

In order to at least approximate the incidence of the venereal infections among the male population, a group of men was selected by the authors as representative of the greater part of the people and serum tests and histories were taken from each man. By means of the information so gathered we have been able to estimate the amount of syphilis and gonorrhea among the adult males and to show that the opinions of the laymen and the doctors are well founded.

The men selected for the observations were an entire company of the Guardia Nacional Dominicana, the native soldiery, and all the inmates of a prison in one of the Dominican towns. The prisoners represent the lower and middle classes of the people, the majority being farmers. Professional and business men of the higher class could not be reached, but their number is relatively small, owing to the rural character of the people. The total number of men examined was 231, and while we realize that this number is very small, we believe that it is sufficient for the purpose of estimation.

The steps of the technic of the serum diagnosis of syphilis as performed in the laboratory of the Field Hospital, Santiago, Dominican Republic, in this series of cases are as follows:

1. Titration of amboceptor paper to determine the unit, two units being used for the test.
2. Titration of guinea-pig serum (40 per cent) for complement unit, two units being used for the test.
3. Two tubes are placed in rack for each test to be made and for the controls, the front tube labeled (a) and the rear tube (b).
4. 0.5 c. c. of normal saline solution is placed in each tube.
5. One drop from a capillary pipette of unheated patient's serum is then placed in tube (a) and in tube (b).
6. Two units of guinea-pig complement are then added to tube (a) and to tube (b).
7. 0.1 c. c. of a 1 to 10 solution of acetone insoluble antigen is next added to tube (a).
8. The rack is then placed in a water bath at 37 C. for 30 minutes.
9. A 1 per cent suspension of washed human red blood cells is then prepared, using 1 c. c. for each test. To this suspension is added the proper amount of amboceptor paper in units as previously determined. A flask containing the above is likewise placed in the water bath at 37 C. for 30 minutes.
10. 0.5 c. c. of the sensitized red cells are then added to tube (a) and tube (b) and the rack replaced in the water bath at the same temperature.

By this method, which is a combination of the Noguchi and Emery technic, readings can be made in 10 or 15 minutes. No reading is attempted unless tube (b) shows complete hemolysis. Known positive and negative controls and antigen controls are used each time the tests are made. The readings, as expressed in positive +, ++, +++, or +++++, and negative, are based on the degree of hemolysis occurring in tube (a).

The amboceptor paper and antigen used were furnished by the laboratory of the United States Naval Medical School, Washington, D. C.

The men of the Guardia Nacional examined were 74 in number and their average age was 23 years. Six of these men were married and 20 were living with women. Of the 74, thirty-seven, or 50 per cent, gave positive serum reactions, divided as follows: Four plus, 19; three plus, 5; two plus, 13. None of the four plus cases had ever had any treatment other than local, but 2 of the three plus cases and 10 of the two plus cases had had mercury in some form. Nine men denied having ever had a chancre and in none of these nine could any scar be found on the penis.

The men in the prison did not show as high a percentage of positive reactions as did the Guardia. Of the 157 men examined, there were 62 positive, or 39 per cent. The reactions were divided as follows: Four plus, 33; three plus, 6; two plus, 20; one plus, 3. Salvarsan had been received by two of the men showing a one plus reaction, and mercury had been given to 16 of the men showing a two plus reaction. Six of the men having a four plus reaction denied having had a chancre.

Very little could be determined from the histories as to the occurrence of symptoms. The lack of education and intelligence on the part of the men rendered the histories vague and uncertain. In 40 cases, however, the patient admitted having had lymphadenitis, although whether this was due to the syphilitic infection or to the gonococcus could not be determined, owing to the large number of cases having gonorrhea.

Thirty-three of the 37 Guardia who had positive tests stated that they had had gonorrhea one or more times. Of the 62 prisoners having positive serum reactions, 17 admitted having had gonorrhea, and of 90 others questioned, 22 stated that they had had the infection.

A physical examination of the syphilitic men showed them to be in surprisingly good condition. By far the greater number (90 per cent) showed no signs of the disease excepting glandular enlargement, and in 12 per cent of these men only the inguinal glands were involved. None of these men complained of any subjective symptoms. Eight per cent of the cases showed the symptoms and signs or aortitis, and three cases had gummatous lesions.

The condition in which the men were found is considered remarkable in view of the fact that so small a number had had any but local treatment. With the disappearance of the chancre all treatment was usually discontinued, and the disease allowed to take its course. One can not but be impressed by the effect of heredity on disease shown here so strikingly. Very few cases of nerve syphilis are seen in this country.

The customs and lack of education of the people are responsible for the high venereal rate. There is a lack of morals rather than a failure to observe them. Prior to the American occupation zones of prostitution were tolerated in all the towns of the Republic, and the prostitutes were examined by municipal physicians. The examination was perfunctory, and probably did nothing toward restricting the spread of venereal disease, while the treatment given to sick prostitutes did not include salvarsan or any antisymphilitic treatment.

Registration of venereal diseases was begun in 1920, and prior to this year there were no free dispensaries for the treatment of the poor.

The lack of education of the people is very striking and impeded us in taking histories. While the ignorance is general, it is particularly noticeable in regard to venereal disease. The majority of the people do not know that a chancre is the initial lesion of syphilis, nor what syphilis is. The cures for chancre and gonorrhea are numerous and disgusting. They not only consist of patent medicines but also of many home remedies and vicious practices.

The incidence of syphilis among the adult male Dominicans, as indicated by serum tests on a series of 231 cases, is about 44 per cent.

The incidence of gonorrhea, as indicated by statements of adult male Dominicans, is 38 per cent. We believe these figures to be low, and are sure that the percentage given is only an approximation.

Syphilis among Dominicans is characterized by the mildness of the symptoms, due, we believe, to the influence of heredity.

Until means have been taken to educate the people and to treat the poor very little can be done to decrease the incidence of the venereal infections.

THE AMERICAN LEGATION GUARD, MANAGUA, NICARAGUA.¹

By F. F. MURDOCK, Lieutenant Commander, Medical Corps, United States Navy.

The population of Managua is about 40,000, fully three-fourths, if not more, of this number consisting of low-bred Indians and half-breeds, living in mud huts in company with hogs and vermin. There is no health department, no reporting of contagious diseases, and, with the exception of special intestinal parasite work under the direction of the Rockefeller Foundation no sanitary supervision of any sort. Prostitution is practically universal among the lower class, girls starting this life usually at 13 or 14 years of age. Venereal disease is present to a high degree, with very little attempt at treatment, and then as a rule only by patent medicines. The native liquor (which is used by our men to a large extent) is made from sugar cane, stands about 55 per cent alcohol, is not aged in any way, sells for 10 cents a drink (50 mls), and three drinks produce intoxication, acting as a strong aphrodisiac, as well as making the victim obstreperous.

Filthiness in person and habits, lying, deceitfulness, cruelty, and thievery are outstanding traits of the people in the city. It is only fair to say, however, that the rural population, and therefore the majority of Nicaraguans, are of a much better type.

There are no amusements in the city excepting a moving-picture house and biweekly band concerts of a very low grade. Nor will the better class of natives associate with our men. Practically the only resorts or places of amusement open to our men are dirty "cantinas," where in company with the more vicious element of the native population they are served liquor by diseased prostitutes, anxious to get the man in the condition most favorable to their own business.

With the exception of a very small park of scant beauty there is no place for a pleasure walk. There are few sidewalks, and the streets are several inches deep with mud during the wet season and with dust in the dry. A high wind prevails during the latter season, sweeping the dust, consisting in part of house filth, human excre-

¹ Extracted from official report to the Surgeon General.

ment, and parts of dead animals, from one end of the city to the other. Except along the main street, no attempt is made to lay this dust by means of sprinkling.

Our camp, covering about 4 acres, is located in the leeward corner of the native "Campo de Marte," the natives occupying the remaining 22 acres. The area at our disposal is so taken up by buildings that with the exception of two tennis courts and the parade ground (60 by 60 yards) there is no available ground for amusement purposes. Neither is there proper space in the buildings for indoor amusements of any kind. The entire camp is a temporary makeshift affair, situated to leeward of a dirty and congested tropical city, and it can not be made to possess that degree of attractiveness which appeals to the average man. As was well brought out during our recent epidemic of yellow fever, and as discussed in former sanitary reports, the structure of the building is entirely unsuited for tropical barracks. It is largely for these reasons that our men seek their amusements in the city of Managua.

The evil influence of this unfavorable environment can well be illustrated by considering its effects upon the new detail of men received here on October 16, 1919. These are typical of what has been occurring at this post in the past.

The detail consisted of 47 men, 22 of whom were under 21 years of age. Plenty of cheap liquor with prostitutes as plentiful and as cheap was a novelty such as but few had experienced before. Moreover, many of them were, for the first time, away from home and more or less restraining influences. During the week after the first pay day (notwithstanding advice and warning) an average of one-sixth of all men going on liberty checked in as having been exposed to venereal infection. Since the arrival of the detail two and one-half months ago 10 of them (22 per cent) have been admitted for venereal disease, while there have been an equal number of disciplinary actions taken for infractions of discipline due directly or indirectly to drunkenness. The novelty of the situation is now beginning to wear off, not however, before a few men have been started on the road of the venereal derelict or drunkard.

Former experience has been that these men having suffered a certain amount of moral degeneration will now seek a means of continuing their sexual indulgences without running the risk of venereal infection, and soon we will again have 25 per cent of our men each supporting and living with his own woman in the city and having children by them, whom he will naturally leave behind when he is ordered to the United States. He returns a morally degraded man, having lost his finer instincts and ideals of life, and always ready to return to a tropical post with its abundance of cheap liquor and prostitutes.

The only death occurring in this command during the past two years was due to alcoholic poisoning. The use of alcohol by the men of this post is far above the average for the same number of men at a station in the United States, and the bad effects in all respects are correspondingly greater because of the very cheap grade of liquor consumed.

That this unseemly conduct on the part of the men is due in large part to their very unfavorable environment seems to be proved by the fact that during the season when our rifle range (situated on the shore of Lake Managua, $1\frac{1}{2}$ miles from the city) is open the men prefer spending the greater part of their free time in swimming, hunting, playing baseball, etc., to going on liberty in the city. It has often been noted that men who are in the habit of passing all their free evenings in the city while at the camp will only request liberty to the city once a week while at the range. If given an opportunity for physical exercise and out-of-door recreation, most of them take full advantage of it. The shortage of men at present does not allow hunting parties, etc., as was the custom during the first years of this post. It is also a fact that on evenings when moving pictures or other forms of entertainment are given in the camp practically all the men off duty attend. Therefore, to properly appreciate and improve the conditions under which our men are living the following three facts must be taken into account:

1. The present camp site (4 acres for quarters for 2 officers and 100 men) does not furnish opportunity for necessary physical exercise or amusement, nor are the buildings of such arrangement or structure as to make them suitable for a tropical military barracks, according to our modern standards.

2. The city of Managua is the only other available source of recreation and amusement, and almost without exception the amusements are of a demoralizing and degrading nature.

3. What evidence we have tends to prove that when the men are given an opportunity for healthful recreation they prefer it to that which is at present ordinarily available.

The number of sick days for 1919 was 600, as against 523 in 1918. There was very little rain during the wet season, resulting in only 25 sick days for malaria this year (without quinine prophylaxis), as against 42 in 1918 (with prophylaxis). The sick days for venereal disease show an increase of from 113 (out of a total of 523) in 1918 to 261 (out of a total of 600) in 1919. Of a total of 184 admissions and readmissions, 78 were for venereal disease. This increase was due principally to the reporting of three new details of men during the year, with a correspondingly larger number of venereal exposures as referred to previously.

There were 130 sick days from yellow fever. This has been the first year in the history of the post in which this disease has been present. If we compare the number of sick days, exclusive of venereal disease, in 1918, with those exclusive of venereal disease and yellow fever in 1919 there is a marked decrease—i. e., from 410 in 1918 to 209 in 1919. This decrease in general sick days may, we think, be attributed largely to the better physical condition of men fresh from the United States, as compared with the more or less debilitated condition of those who have served their full three years in a very unfavorable tropical environment.

During July and August there were rumors of cases of yellow fever, first in Leon and later in Managua. It was impossible to confirm these rumors as there were no autopsies. Doctors declined to discuss their cases and seemed desirous of keeping the conditions obscured. The rumors were also officially denied on several occasions. There were, however, at this time, well-defined cases in the country about the Gulf of Fonseca, and the possibility of their presence in Managua was appreciated by all.

On September 10 and 12 two cases were admitted to the sick list under a provisional diagnosis of yellow fever. Two members of the Rockefeller Foundation Yellow Fever Commission were in the city on the 14th and 15th and were asked to see the cases for the purpose of clearing up the diagnosis. After seeing the cases twice the opinion was expressed that they were not yellow fever.

The members of the commission explained the recent work of Noguchi in isolating the causative organism of yellow fever, etc., and very kindly offered their services to the camp should they be needed.

Later developments in our first two cases, as well as in subsequent cases of a similar nature, led the writer to believe that we were having an atypical form of yellow fever and all cases were treated as such, all precautions being at the same time taken at the camp. On October 8, a civilian under the writer's care died from a similar condition. An autopsy was performed which showed typical yellow-fever lesions (macroscopic) of the liver, kidneys, and stomach. A telegram was immediately sent to the commission, who were then in Honduras, informing them of the presence of yellow fever and asking them to forward to us some of Noguchi's vaccine and curative serum. The commission responded immediately to our request, coming to Managua themselves. The conditions were explained to the men of the command and an opportunity given for all those desiring vaccination to receive it. Forty-one officers and men were vaccinated, the first dose being October 21. The commission then started a general cleaning up of mosquito-breeding places in the city with good

results. This work, however, has now been left to be handled by the native government, and its effectiveness will rapidly decrease under this plan, the municipality already having dismissed their four sanitary inspectors because of the expense. At present there are very few cases of yellow fever in the city, but the disease continues to be a potential menace.

During September there were 2 cases of yellow fever in the camp; during October, 8; November, 3; in December, 1. During November there were 3 cases reported as "fever of unknown cause," which probably were very mild cases of yellow fever, but did not present symptoms sufficiently definite for a positive diagnosis. Fortunately, there were no deaths. All the cases occurring during November and December were mild, and occurred in those vaccinated as well as in those not receiving the injections.

The proper rationing of the men has often been difficult. Meat is the only article of diet which it is practical to procure in the country; the steamship service is often irregular and many of the commissary supplies received from the United States arrive in a very bad condition, often due to faulty containers. This applies particularly to flour. In one year 41 per cent of the potatoes and 53 per cent of the onions received were considered unfit for use.

This is of consequence from our point of view, for, as a result of the unexpected shortage, it is often impossible to balance the ration. Moreover, unless an article such as bread is prepared from satisfactory ingredients it is not eaten by the men, which is the equivalent of not giving it to them, and the ration is short.

The change which has recently gone into effect, which allows this post the Navy ration in kind in place of the money equivalent of the Army ration, will help toward bettering these conditions.

As there is but one medical officer available for duty at this post his almost continuous presence in the city is necessary, and the monotony resulting therefrom can not be appreciated except by one going through the experience. The writer has only been away from the city overnight on five occasions; and there has only been one day in which he has not been at the sick bay at some hour, during his three years' tour of duty. Because of this monotony and the depressing effects of a continuous tropical climate it is felt that a medical officer could do himself more justice and treat those under his care better if his tour of duty were reduced to 2½ years—a period similar to that served by the Marine officers.

SANITARY CONDITIONS IN VLADIVOSTOK.¹

By A. S. JUDY, Lieutenant, Medical Corps, United States Navy.

LOCATION.

The large bay of Peter the Great indentates the southern part of the Siberian coast, which runs east and west at this point. At the head of the bay a peninsula extends southwestward, dividing the bay into two small bodies, called the Gulfs of Amur on the west and Ussuri on the east. From the Amur Gulf a small arm extends eastward, into the blunt end of the peninsula and called the Golden Horn, on the shores of which lies the city of Vladivostok. A large island, known as Russian Island, lies off the south end of the peninsula. Latitude, 43° 7' N.; longitude, 131° 54' E.

The city is exposed to extremes of temperature, the winters being long and cold and the summers hot. The prevailing winds are from the northwest in winter and from the southeast in summer with heavy fogs and rains.

The city is built on the hills surrounding the bay, some of which rise to a height of 700 feet and continue northward in a series of parallel ridges. The harbor is usually covered with ice from the middle of December to the 1st of March. The average yearly precipitation of rain and snow is about 14.8 inches.

THE PEOPLE AND THEIR HABITS.

The population of Vladivostok before the onset of the present war was about 60,000. At this time it is estimated to be about 400,000, due to the presence of great numbers of refugees from various parts of Siberia, and various bodies of allied troops, who probably exceed in number the population of the city before the war, and who have requisitioned numerous buildings and barracks for the use of their troops, forcing the ever-increasing number of civilians and refugees to huddle together in overcrowded rooms and houses, or to live in hastily constructed shacks, which have sprung up very numerous over the surrounding hills, with no regard for the most meager sanitary measures.

A most striking thing in Vladivostok at the present time is the apparently large percentage of illiterate and poor amongst the population. The streets are crowded with the lower-class Russian, the ignorant moujik, evidenced by his shaggy and filthy clothes, his dirty hands and face, and general unkempt appearance, often clothed in heavy, dirty furs, not only an excellent subject for typhus fever himself, but affording an excellent means for the dis-

¹ Prepared by direction of the commander in chief, United States Asiatic Fleet.

semination of the infected louse. They are seen living in hastily constructed shacks, with the cracks and windows closed with mud, sacks, or old discarded articles of clothing, admitting of no fresh air to dilute the smoke and smell of filth accumulating while they huddle together for warmth during the winter months. At one end of their home or usually close by is found the barn, containing the live stock, consisting usually of horses, pigs, and chickens. The pigs and chickens can be seen running around close to the house, the pigs eating the filth in the vicinity of the shack and in the streets, and probably affording a good source of tapeworm and trichina-infected pork, and dropping filth around the wells.

The members of the family can be seen drawing their water from wells situated at varying distances from the houses. The wells are uncovered, as a rule, with only a slightly raised wall around the top to prevent the entrance of filth from barns and houses. Wells are a common source of water and the care they receive is very slight.

Conditions of this nature are most conducive to the spread of disease, and should an epidemic of any kind, such as bubonic plague, cholera, or smallpox start, its arrest would be difficult unless stringent measures were used under a skilled sanitary corps. The wonder is that more disease is not present and more epidemics do not start, and can probably be explained by the fact that each adult Russian represents the height of resistance to disease of the Russian race, for the percentage of deaths among the Russian children is very high: and for each Russian adult alive hundreds have probably died in their youth, he representing the survival of the fittest of this unit.

Another great source of danger as a starting point of an epidemic is the Chinese district, where living conditions are even worse than among the Russians. Any epidemic occurring will probably have its source in this district. The Chinaman at best is a dirty fellow, but in this district he can be seen at his worst, as his knowledge of sanitation is almost nil and his indifference to the elemental rules of sanitation is marked. The ignorant Chinaman can be seen at almost any hour of the day and on almost any street urinating or defecating as the occasion arises, the material to remain in the streets until washed away by the melting snow or rains, and probably soaking into the ground, to later drain into the numerous wells from which drinking water is obtained.

He is the most common means of transport for goods of all kinds, and can be seen early and late with the familiar rack on his back, carrying through the streets a load of meat, vegetables, or other provisions, exposed to the dust and flies. Should he become tired he sets his rack of meat on the ground or against some building, where it is exposed to many sources of contamination, no law requir-

ing him to cover this food or use any precautions in its transportation. A trip through the Chinese district will show these Chinamen huddled together in rows, on long bunks covered with straw, never removing their clothes nor bathing, to arise next day and again carry meat and provisions for the use of the city. This Chinese district, which is the source of so much food and furnishes the means for its transportation, affords strong possibilities as a source of epidemics of any character.

Many of the provision shops are run by Chinese and are exceedingly dirty. Sausages and hams can be seen hanging in the open, exposed to flies and dust from the streets. Butcher shops and fruit stands are not screened and are similarly exposed.

It is common to see wagons loaded with meat or provisions of various kinds turn over or break down, the meat rolling into the dirt of the streets, and the dirty Chinaman who is hauling it picks it up and replaces it, and later distributes it as food for the city.

WATER SUPPLY.

All territory surrounding the railroad track, lying mainly to the north of the city, is supplied by water from First and Second Russian Rivers, which lie to the north of the city and empty into Amur Bay, running east and west. The water is of good quality and is secured mainly from large wells along the course of the above rivers, and in the past was examined frequently by the Russian health authorities of the city.

One reservoir exists near the source of First River as an emergency reservoir supply. The navy has three shallow reservoirs of about 4 or 5 acres each at Hospital Creek, northeast of the city. They are uncovered and probably receive drainage from the numerous small farmhouses in close proximity. They were formerly used to supply the Siberian Fleet, and a pipe line about 6 inches in diameter extended to the naval hospital and other buildings of the navy yard. In the hills near the eastern end of Svyetlanskaya Street is another small uncovered reservoir supplying water to the navy yard and vicinity.

Numerous private wells are found all over the city for supplying various private homes, and these wells are very poorly guarded and covered, and are great sources of danger.

In November, 1919, 70 cases of typhoid fever occurred which were traced to one well in the First River district. The well was closed and disinfected by the Russian health authorities.

A plan is on foot at the present time to bring water into the city from the Black River, which lies farther northward from the

city and is supposed to have an unlimited supply of very good water. Many homes are supplied with water by Chinese water carriers, who distribute the water from carts and cans in a most insanitary and dangerous manner.

SEWERAGE SYSTEM.

Only a small amount of the city, approximately 10 per cent, is supplied with a sewerage system, which empties into the outer bay. The great majority of the homes have small tanks, into which all refuse drains, and when full the contents are emptied into wagons especially designed for the removal of this material. The wagons empty their contents into the bay.

DISEASES.

1. *Typhus fever*.—Typhus fever has been endemic in Vladivostok for the past three years, brought to the city by the various troops and refugees who flocked to the city during this period. Owing to the unsettled conditions and the difficulty of reporting cases, the exact number occurring this year is unknown, but is thought to have been several thousand. The greatest number of cases occurred during the months of January, February, and March, the first week in March about 120 known cases being reported, 110 the following week, and 100 cases the next week. Death occurred in from 6 to 8 per cent of cases.

Similar conditions existed during 1918, the greater number of cases occurring during January and February. During the past two years cases have appeared during all months of the year. In Omsk, Irkutsk, and surrounding regions the number of cases was much larger.

The unsettled conditions of the country, interfering with the enforcement of sanitary laws; the overcrowding; the carelessness in personal hygiene; the character of clothing; and movements of the people from place to place are potent factors in the dissemination of typhus fever.

2. *Cholera*.—Four hundred cases of cholera occurred in 1919, attributable to carelessness in the handling of food and water. No cases have been reported this year.

3. *Typhoid fever*.—In October and November, 1919, about 70 cases occurred in the vicinity of one well in the First River country, about 10 cases occurring daily until the well was closed and disinfected. A general order has been in force for some years requiring inhabitants to boil all water used for drinking purposes.

4. *Bubonic plague*.—No cases have occurred.

5. *Scarlet fever, etc.*—Scarlet fever, diphtheria, and measles are present in the usual percentage ordinarily found in cities of this size, occurring mainly in children.

6. *Tuberculosis.*—Tuberculosis is common among the Russians, and a special department existed in the past to care for these cases and to promote preventive measures.

7. *Venereal disease.*—Venereal disease is very prevalent at this time, as the city contains numerous women who have come to the city from all parts of Russia, associating with civilians and soldiers of all nationalities in their travels and invariably transmitting venereal disease. Numerous cafés with side rooms abound over the city, making it an easy matter for association with women, who, from the very nature of conditions present, must be infected with venereal disease.

There are two segregated districts—one known as the Kopec Hill district and the other in the Chinese district. Here are found women of the lowest type, who are capable of transmitting venereal disease, and also the acute exanthemata, as they are usually of a youthful age. Their houses are reeking with filth, and as these districts are the meeting places of many nationalities, they stand out prominently as the possible source of many diseases, especially typhus. Drugs of all kinds are easily procurable in these districts, the women invariably using cocaine. The percentage of syphilis and chancroidal infection occurring is high.

8. *Malaria and yellow fever.*—Very few mosquitoes are present and none are of the species capable of transmitting malaria or yellow fever.

9. *Smallpox.*—A few cases occurred in January and February, 1920; and while smallpox is always present it has never assumed epidemic proportions.

All contagious diseases are reportable.

Summing up the above conditions we have the following as sources of danger relative to the starting of epidemics:

- (1) The ignorance of the great majority of the population.
- (2) Present overcrowded conditions.
- (3) Insanitary homes and surroundings.
- (4) The presence of a large and ignorant Chinese population.
- (5) Insanitary acts of the lower classes.
- (6) Carelessness in the preparation and handling of food.
- (7) Lack of bathing facilities.
- (8) Carelessness in control of city wells.
- (9) Lack of laws enforcing sanitary measures.
- (10) The constant pouring into the city of people from various parts of Russia and Siberia.
- (11) The accumulation of filth affording breeding places for countless numbers of flies, which swarm over the city in the warmer months.
- (12) The presence of innumerable prostitutes, who invariably transmit venereal disease.

HOSPITALS.

The city has five hospitals, with a total capacity of about 2,000 patients, three being military hospitals and two municipal hospitals. The largest, most modern, and best equipped hospital is that located on Aleutskya Street and formerly known as a municipal hospital. It is situated on one of the hills overlooking Amur Bay occupying ground equal to that of the average American city block. It is centrally located and easily reached over good roads, passable for automobiles or trucks.

Under the old régime, and also the Kolchak Government, the hospital was managed by a board of directors chosen from the hospital staff of physicians. Under the present Zemstvo or provisional government, all connected with the hospital in any capacity belong to the hospital Soviet, which controls all activities of the hospital. This Soviet comprises 17 members, of whom only two are physicians on the staff, the rest of the members coming from the midwives, scrubwomen, nurses, gardeners, orderlies, and other workmen of the hospital. The physicians are absolutely under the control of this Soviet, which is endeavoring to run the hospital, tell the physicians what they shall do, how the hospital shall be run, and what equipment shall be bought. It is apparent that such an arrangement is not conducive to good results, and what was once a first-class, well-kept hospital, is now in a somewhat run-down condition.

The hospital buildings are two stories high, of brick and stone construction, of excellent workmanship, and absolutely fireproof. It is laid out on a three-unit plan comprising male and female surgical departments and medical department. Its present capacity, including an isolation building close by, is about 600 patients.

All parts of the building are equipped with a modern radiator system for heating. Numerous windows provide much light and fresh air, while air shafts leading into each ward provide a further supply of fresh air.

Each ward is well lighted by electricity, and the location of the hospital affords a maximum amount of light and fresh air. A small part of the hospital was erected in 1908, while in 1917 the greater part of the hospital was built and the old part remodeled.

On the lower floor are located the administration offices, reception rooms, receiving room, and male surgical wards, for both clean and septic cases. The hospital is run on the ward system, individual rooms only being supplied for those cases which are seriously ill. The wards are well equipped with standard iron beds, which are well spaced; the bedding is clean and of good quality, and at either end of the ward is a smaller ward, with beds and much window

space, which can be used as a solarium. Diet kitchens are conveniently located.

The floors are of dark tile, while white tile extends upward on the walls to a height of about $5\frac{1}{2}$ feet. The operating room on the main floor is an exceptionally good one, well lighted by means of numerous windows, and a huge skylight overhead.

The floor is of tile, as are also the walls. The operating table is a modern one, while the instruments are numerous and modern, many of standard American and German patterns. The steam sterilizers and autoclavs are large and of late design. Large groups of electric lights are installed overhead for night work.

The upper floor contains the female septic and aseptic surgical wards, similar to the above-described wards and operating room. At either end of the corridor is a modern elevator for use of patients. The medical unit is built on the same plan with the lower floor for male patients and the upper for females. Modern bathrooms are provided.

The hospital has a modern laboratory, but no equipment for X-ray work at the present time, although this is soon to be installed.

A separate building of wood construction, lying about 50 yards from the main buildings, is used for contagious cases and has accommodations for about 200 patients. It houses about 100 typhus patients at this time.

The staff now comprises about 18 physicians and 60 nurses, with numerous midwives and orderlies. All the specialties are represented, including eye, ear, nose, throat, genito-urinary, gynecology, obstetrics, internal medicine, and surgery.

The present shortage of water has caused some difficulty in the hospital. Water for washing is obtained from a near-by well, while that for drinking comes from First River.

This hospital is suitable for the care of American naval patients, the cost per day for food being 150 rubles, with rubles selling about 400 for the dollar. Medicines and surgical treatment prices depend on the nature of the case. American naval patients can be sent here, but they must be cared for by the regular hospital physicians, it being impossible for naval surgeons to operate or care for their own men.

NAVAL MILITARY HOSPITAL.

Near the eastern end of Svyetlanskaya Street and in the navy yard lies a group of buildings with a capacity of about 500 men used as the naval hospital. The main buildings are old, of brick and stone construction, and rapidly going to ruin under the present régime. Two fairly good operating rooms with sterilizing facilities and instruments of fair quality are present. An X-ray laboratory with equip-

ment for electrotherapeutics and a laboratory with modern equipment, present an agreeable surprise to the visitor.

This hospital has a good water supply and fairly good facilities for bathing, the best part of the buildings being that formerly used for officers, containing private rooms, and good bathrooms, all now used for the treatment of women patients.

The staff was formerly composed of seven naval surgeons, but now has about 14 civilian doctors and a number of nurses and orderlies. The hospital is no longer a military one, but receives all types of cases, male and female.

MILITARY HOSPITAL AT THE FORTRESS OF VLADIVOSTOK.

On the hills just beyond eastern end of Svyetlanskaya Street is the hospital formerly used by the soldiers in this region. It is a one-story brick building, built on the barracks plan, with accommodation for about 300 patients. It is in poor condition and its equipment is of little value. All kinds of male patients are being cared for.

The remaining two hospitals are of minor importance and their present condition is similar to that of the naval military hospital.

Numerous large brick barracks are located all over the surrounding hillsides and were formerly used as barracks for the troops of the Czar, any one of which could be made into a very good temporary hospital for military purposes by a few minor changes.

DISINTERMENT OF BODIES.

Before the removal of any bodies permission must be obtained from the city health officer, who determines from the cause of death whether or not the body can be shipped from the country immediately, or can be disinterred and shipped without danger. With the present unsettled conditions and the unstable and changing governments present in Vladivostok, no information can be obtained as to the exact length of time which shall elapse before contagious cases can be disinterred, the present health authorities stating that in their opinion, smallpox cases should remain buried for several months before being disinterred. No facilities for cremation are available.

TYPHUS AMONG THE CZECH FORCES IN SIBERIA.

The following information was obtained from the chief surgeon of the Czech forces:

From June, 1919, to March, 1920, there occurred about 100 cases of typhus fever among the Czech forces distributed from Harbin to Vladivostok and comprising an army of about 30,000 men. Death

occurred in approximately 10 per cent of the cases, and the greatest number of cases occurred during the months of January, February, and March. Very similar conditions existed during the preceding year.

The preventive measures in use by the Czech forces are delousing trains, with bathing facilities, and fumigation of suspected trains and quarters, each staff having a delousing train. Every train coming into Vladivostok is stopped at First River, a short distance from Vladivostok, and each man is required to bathe, while his clothes are put through the delousing process.

Ten cases of typhoid fever have occurred during the above period in the same body of troops, attributable to infected water. Three cases of scarlet fever and seven cases of smallpox have been reported, of which two cases died. Vaccination with cowpox virus and the use of antityphoid vaccine and paratyphoid A and B vaccine is compulsory in the Czech forces. Cases of tuberculosis are infrequent at the present time, but in the past nine months 25 cases have been sent home.

The percentage of venereal disease among these troops is unknown, but it is estimated by the chief surgeon as similar to that reported in all armies. Facilities for the taking of venereal prophylaxis are furnished all men, but it is not compulsory.

Before the evacuation of any Czech forces from Vladivostok all men are placed in quarantine for a period of 10 days, and during this time they are vaccinated and their clothing is put through a delousing process. Should any cases of syphilis be discovered among the men, they must remain for a period of six months, and during this time they are given two periods of salvarsan treatment along with a course of mercurial treatment. All men must show that they are free from gonorrhea before evacuation.

During the present epidemic of influenza, which has been rather marked among troops present, only one case of influenza has been reported in the Czech forces.

The above information relative to health conditions among Czech forces is furnished as a possible standard of comparison for a similar body of troops on active duty in Russia and Siberia. It must be taken into consideration that these Czech forces are veteran fighters, all several years above the average recruit in age, of exceptionally good physique, well disciplined, well clothed, and with an exceptionally good morale and esprit de corps.

**REPORT ON HOSPITAL RECORDS AT THE U. S. NAVAL HOSPITAL,
ANNAPOLIS, MD.**

By H. W. SMITH, Commander, Medical Corps, United States Navy.

The writer has been concerned, as have others, as to how best to comply with the bureau's orders regarding the permanent medical files at hospitals. All institutions are making some effort to keep up the two sets of records, the clinical case records and the health record, but in all, so far as I know, unwillingness on the part of medical officers to duplicate their clerical work has resulted in one set or the other being reasonably complete, but never both. This unwillingness can be overcome, but it is so natural and universal that it can be overcome only by measures disproportionate to the end sought. It is possibly wiser to try to discern the tendencies shaping themselves in a transitional period, examine them and exploit them so far as may appear profitable.

After about two years of personal experience in the keeping of these clinical records and extended observation of the systems evolved independently at several hospitals, it seems to me certain that the orders will eventually entail no little change in our methods of taking and keeping case records—a result not perhaps foreseen when the orders were issued. What of the changes may finally be adopted will depend of course on the views of the bureau, but, pending expression of the bureau's views, many schemes have been put into operation at the several hospitals. They are all tentative in character and differ more or less one from another; yet all show basic similarities, among which are two well-defined tendencies, more or less fully developed, common to all—the utilization of the ward clinical chart as the nucleus for assembling all data concerning a patient, and the contraction of the health record entries to a case summary compiled at the time of a patient's discharge.

The first tendency of which I speak is altogether good. It complies with the bureau's instructions and is an excellent procedure from a purely medical viewpoint. I can see no objection to its becoming an established practice.

Unfortunately there remains the difficulty of getting the data collected transferred to the health record. The obvious way of accomplishing this is to have a medical officer copy each week into the health record the mass of collected data. This has, however, seemed impracticable because of the difficulty in inducing medical officers to duplicate their clerical work—work always disliked and often slighted—without disciplinary action and injury to contentment. Hence, some means has been generally sought of effecting the transfer with little or no additional work on the part of the professional man.

One means often suggested is to have a yeoman at the time of a patient's discharge type in the health record all the data collected, suitably arranged in logical and chronological sequence. The entries would then contain the complete data, legibly written and occupying relatively little space. Unfortunately we have at present a clerical force insufficient in number and not qualified to do such work, and the task, if undertaken, will necessarily remain with the medical officer.

The medical officer will not make for the health records unabridged copies of his case records; no one else is capable of doing it; and yet the health records must contain the patient's medical history. This being the situation, it is easy to understand the genesis of the universal tendency to contract the health record entries to a summary of the case. This has in fact been the practice in at least one large hospital, in which all health records were kept locked in the personnel office and released to medical officers only at the time of a patient's discharge. Inevitably the health record entries became under this system a brief résumé.

The practice of making the health record entries a concise summary, embracing only the essential features of a case, has much to recommend it. An intelligent recapitulation of a case history, together with a full presentation of the peculiar data required by the service, would almost always suffice for every purpose. Only rarely might the diagnosis be so questioned at a later date that an unabridged record of all examinations made would be desired, and in such instance the full record would be on file in a known place.

The conclusion generally arrived at seems to be that it is impracticable to obtain complete duplicate case histories; that the hospital records, being automatically assembled, will be the complete document, and that the health record will by a natural tendency come to contain all the facts relating to "duty" and a summary only of the medical features of the case.

In connection with this tendency toward abbreviating the health record it should be pointed out that this practice, involving as it does such frank departure from existing instructions, will require specific authorization from the bureau. Either the requirements regarding the keeping of health records should be suspended altogether or so modified that they may apply as an alternative to the clinical records. (See Manual, ch. 13, sec. 2, p. 153, especially par. 2224.)

If the tendencies exist as I see them, a decision should be made by the bureau at an early date as to whether the practices foreshadowed are desirable or not, so that they may either be legalized or suppressed before becoming established.

In designing the system in use in this hospital thought has been given to make it produce adequate records and to make its operation

easy. A collateral aim was to make it serve in its operation to coerce, by imperative suggestion, reluctant medical officers into taking searching histories and conducting exhaustive examinations. As conducive to these aims two principles have been followed that seem worthy of general adoption:

First. In the taking of histories and the making of subsequent notations it has been recognized that a dictation concurrent with the examinations on which it is based is the most reliably accurate form of record and the one likely to be the most comprehensive. I believe that there can be no divergence of opinion regarding the unique value of original notes, nor regarding the probability of their completeness when each observation as made is dictated to a bystander. In practice the dictation is taken by a nurse or hospital corpsman on the backs of the charts or notes—a ready method found practicable.

Second. In order to avoid unnecessary duplication, all reports concerning a case emanating from the several departments are filed with his clinical records, no copying being required.

This system, if so simple an arrangement may be so styled, is effective in assembling a very satisfactory history of a case, together with accessory data, but does not provide for its transference to the health record. For this we had to rely on the several medical officers performing faithfully an irksome task.

GENERAL CHARACTERISTICS OF FORMS EMPLOYED.

1. Of uniform size.
2. Uniformly perforated at the top for binding.
3. All printed so that one reads downward, the long way on the sheet. (See appended laboratory report.)
4. If printed on both sides, the printing should be in opposite directions, (See appended laboratory report.)
5. These forms, and the health records also, should have lines spaced to correspond with typewriter spacing.

ROUTINE HANDLING OF FORMS.

1. Certain records, as the chart and notes, are maintained in the wards.
2. Histories and notations by the medical officer are written on the backs of these forms.
3. Operative reports are dictated in the operating room and written in duplicate, one copy going to the ward, the other being retained for reference and record.
4. Laboratory reports originate in the ward or with a medical officer, and accompany the specimen, the examinations desired being indicated by checking. This copy is returned with the checked data supplied, while a duplicate is retained for reference and as a record of work performed.
5. Consultation slips follow a similar course, the department consulted returning one copy and retaining a duplicate for reference and as a record of

work performed. In the X-ray department these duplicates serve as an alphabetical index of names and a guide to the filing system.

FORMS REQUIRED.

In selecting the forms listed below, effort has been made to limit the number to those necessary and to utilize existing forms. It might be well to conform in a measure to recognized standards, and attention is invited in this connection to the Hospital Standardization Series of Bulletins issued by the American College of Surgeons, particularly to Bulletin No. 2, Volume IV, January, 1919, on "Case Record Forms."

1. A. Clinical Chart, N. M. S. Q. This should be radically altered. It should show graphic curves for pulse and respiration as well as for temperature; all data should be readable without shifting the position of the sheet; the squares should be much smaller, and there should be blocks for "stools" and for "day of disease" or "day after operation."

The Graphic Chart, form 16 of the A. C. S. Bulletin, is an excellent form. This might well be adopted, with two changes—provision for "day of disease," and leaving the division into hours and days optional for as frequent observations as may be desired.

1. B. The back of the clinical chart is suitable for recording the original history of a patient. A form may be used, but since the amount of material never corresponds to the space allotted to it on a printed form, it seems better simply to put a caption "Medical notes" and print lines. On this and following sheets the progress of the case is noted. This form is for the physician's notes.

2. A. Clinical Notes, N. M. S. Hospital Form No. 17. This may be continued without change other than the omission of "Urine" and "Stools" (recorded on the graphic chart), the additional space being transferred to "remarks." This form is for the nurses' notes.

2. B. This form, N. M. S. H. 17, may have lines printed on the back and be used for notes if the additional space is required to supplement the back of the clinical chart.

3. The Treatment Record, form 14 of the A. C. S. Bulletin, is desirable, especially to avoid indefinite, because unnoted, continuation of medication. The first column should not be limited to medication, but should include "or other forms of treatment."

4. Laboratory Report, N. M. S., Hospital Form No. 27, is excellent and may be retained without change except that the printing on the reverse side should be inverted since the sheets are to be bound at the top.

5. The Operative Record, form 6, A. C. S. Bulletin, is very good. It affords no space for recording observations during operation, but an appended clinical chart serves this purpose very well, blood pressure being recorded in the temperature section.

6. Consultation Request. (See appended forms.) This has proved to be a very valuable form for use in requesting and reporting consultations with any special department (E. and E. and X-ray), or between clinical departments. The indirect influence of this form is excellent, and it furnishes a record not usually preserved.

CLINICAL CHART.

No. 1A. (Reduced).

Front.

N. M. S. Hospital Form No. 27.

U. S. NAVAL HOSPITAL, _____, 192—.

No. _____ LABORATORY REPORT. Ward _____

(Name.) (Rate.) (Clinical diagnosis.)

Blood.

Hemoglobin : Per cent _____ Color Index _____

Erythrocytes :

Total red cells per c. mm. _____

Abnormal red cells _____

Leukocytes :

Total white cells per c. mm. _____

Polymorphonuclears (60-70) _____

Transitionals (2-4) _____

Small lymphocytes (20-30) _____

Eosinophiles (1-4) _____

Large lymphocytes (4-8) _____

Mast cells (1-1) _____

Large mononuclears (1-2) _____

Abnormal cells _____

Animal parasites :

Material organisms _____

Other parasites _____

_____, Examiner.

*Feces.***Physical examination :**

Quantity submitted _____

Form and consistence _____

Mucus _____

Color _____

Concretions _____

Odor _____

Chemical examination :

Reaction _____

Fat _____

Blood _____

Bile _____

Starch _____

Microscopical examination :

Food remnants _____

Cellular elements _____

Parasites and ova _____

Crystals _____

Bacteria _____

_____, Examiner.

*Gastric contents.***Physical examination :**

Quantity submitted _____

Color _____

Mucus _____

Sediment, per cent _____

Chemical examination :

Total acidity (50-75°) _____

Free hydrochloric acid (25-50°) _____

Organic acids _____

Combined hydrochloric acid (10-15°) _____

Digestive ferments _____

Acid salts (1-3°) _____

Blood _____

Bile _____

Microscopical examination :

Food remnants _____

Blood cells _____

Yeast cells _____

Sarcinae _____

Epithelial and tissue cells _____

Bacteria _____

_____, Examiner.

*Sputum.***Physical examination :**

Quantity submitted _____

Consistence _____

Color _____

Dittrich's plugs _____

Microscopical examination :

Elastic fibers _____

Charcot-Leyden crystals _____

Red blood cells _____

Fungi, molds, and yeasts _____

Tubercle bacilli _____

Curschmann's spirals _____

Fibrinous casts _____

White blood cells _____

Animal parasites _____

Pneumococci _____

Other bacteria _____

_____, Examiner.

Back.

Examination of urine.

Name _____
 Request of _____
 Total quantity in twenty-four hours _____
 Quantity submitted for examination _____
 Color _____
 Specific gravity _____
 Sugar, per cent _____
 Urea, per cent _____
 Acetone _____

Reaction _____
 Albumen _____
 Grams in twenty-four hours _____
 Grams in twenty-four hours _____
 Diacetic acid _____

Microscopical examination.

Remarks _____

_____, Examiner.

NOTE.—At least 100 cubic centimeters should be sent for examination.

Bottles for specimens must be clean.

Urine must be as fresh as possible when received at the laboratory.

Urea and sugar determinations are of little value unless the exact twenty-four hour amount is received.

Miscellaneous.

Name _____ Rate _____
 Nature of specimen _____
 Request of _____
 Address _____
 Character of examination desired _____

_____, Examiner.

No. 4.

UNITED STATES NAVAL HOSPITAL,

ANNAPOLIS, MARYLAND.

_____, 192__.

Subject: Request for consultation _____

To: Division of _____

Patient's name _____

Rate _____ Ward _____

Case of _____

Opinion requested as to _____

(M. C.), U. S. N.

_____, 192__.

Report _____

No. 6.

(M. C.), U. S. N.

HOSPITAL RECORDS.

By E. U. REED, Commander, Medical Corps, United States Navy.

The following outline suggestions, illustrated by suitable specimen blank forms, are submitted in response to the invitation extended by the editor of the *BULLETIN* for an expression of opinion on this very vital matter:

1. The clinical jacket submitted differs only in some of the data from the form found most satisfactory at the United States Naval Hospital, New York, N. Y. The instructions as to its use are to be found on the inside.

2. The clinical chart submitted needs no explanation.

3. The clinical record may be printed separately or on the back of the clinical chart. I believe it will be found more convenient as a separate form; and convenience will be more conducive to results than lessened bulk in filing.

4. The laboratory examination form is adapted from the one in use at the hospital of the University of Pennsylvania. Rubber-stamp forms for all routine examinations can be used on front and back.

5. The special examination form can be used for consultation and other special reports.

6. The operation report has been adapted from several different forms and from suggestions by Commander C. H. Oman, Medical Corps, United States Navy.

7. The clinical notes (N. M. S. Hospital Form No. 17) should be modified by addition of "page No. —," omission of "U" and "S," with distribution of this space between "Treatment administered" (now designated "Medicine") and "Remarks."

8. In preparing these suggestions I have been assisted by the Hospital Standardization Bulletin on Case Records, issued by the American College of Surgeons; by suggestions submitted by Commander H. W. Smith, Medical Corps, United States Navy; and by forms from civilian hospitals.

CLINICAL JACKET.

Form ____.

Case No. ____.

Name _____ Rank or rate _____
(Surname.) (Christian name-s.)

A. or R. A. from _____ Date _____

Diagnosis on admission _____

Diagnosis changed to _____ Date _____

Discharged to _____

Condition on discharge _____
(Cured, improved, unimproved, worse, or deceased.)Discharged by _____
(D. T., D. D., I. S., or R.)

(Heavy manila paper folded so as to include the other forms and secured with clips.) On the reverse side are the following instructions:

(Fold here.)

A clinical jacket shall be prepared for each patient admitted to the hospital and kept in the ward office until the case is closed. It shall then be completed and sent to the record office with all clinical charts and all important laboratory, X-ray, operation, autopsy, and other clinical reports, properly signed.

A copy of Form M or Form N shall be inclosed when such report has been made.

A case number shall be assigned in the record office to each completed jacket, and the jackets shall be filed according to numbers, indexed by names, and cross indexed under each diagnosis.

No. 1.

Urine	Stools
<p>Respiration.</p>	<p>Pulse.</p>

Day after operation may be entered in red in the space for Day of Disease. Draw heavy line to separate calendar days.

No. 2.

LABORATORY EXAMINATION.

Date..... United States Naval Hospital.....

		Report.
Name.....		
Ward.... Rate.....		
Diagnosis.....		
Specimen submitted (underline):		
Urine.....	Blood.....	
Gastric contents.....		
Feces.....	Sputum.....	
Pus.....	Special.....	
(Separate slip for each specimen)		
Exact examination desired.....		
.....		
.....		
.....		
.....		
.....		
..... (M. C.) U. S. Navy.		..... (M. C.) U. S. Navy.

No. 4.

A DEATH FROM ETHER DUE TO STATUS LYMPHATICUS.¹

By A. W. DUNBAR, Captain, Medical Corps, United States Navy.

The patient, a fireman, third class, a sufferer from chronic bilateral suppurative otitis media of some years' duration, was operated on for removal of the tonsils, which had been incompletely performed nine years before. A submucous resection was done January 1, 1920, to relieve nasal obstruction.

Condition prior to operation.—Moderate yellow, purulent offensive discharge from the left ear. Prominent Schrapnel's membrane. Loss of light reflex. Perforation upper anterior quadrant with scar tissue around it. Right drum perforated in lower posterior quadrant and discharging. Loss of light reflex. Right inferior turbinate large, pale, and impinging against the septum. Tonsils ragged and small and imbedded. Adenoids present. Alternate turgescence of right and left inferior turbinates. Heart and lungs normal. Urine normal. Blood coagulation time $3\frac{1}{2}$ minutes.

Operation.—After preliminary hypodermic injection of morphine sulph. gr. $\frac{1}{4}$ and atropine sulph. gr. $\frac{1}{150}$, ether administration was begun by the drop method at 11.25 a. m. Patient did not take the anesthetic well and it was necessary to push the jaw forward by pressure back of the ramus. Tonsillectomy and adenoidectomy performed. All hemorrhage arrested before the patient was removed from the table. Breathing poor and cyanosis throughout, but relieved by pressure of the jaw forward. Ether discontinued at 11.55 a. m. and patient was in bed in ward at noon. The ether employed (drop method) was $1\frac{1}{4}$ cans or $\frac{1}{16}$ pound (Squibbs).

Aftermath.—Patient required constant forcing of the jaw forward. Pulse 108; color fairly good. At 12.15 p. m. pulse became thready and countenance cyanosed. Oxygen administered. At 1.30 p. m. respiration became irregular and pulse 138. Oxygen repeated and atropine gr. $\frac{1}{100}$ given. The response to these measures was unsatisfactory, and the pressure of the jaw forward had to be maintained continuously. At 3 p. m. pulse was 118 and respiration 28. Atropine was repeated with distinct benefit. At 3.25 p. m. pulse became weak and irregular and the breathing was very unsatisfactory. Strychnine gr. $\frac{1}{30}$ was given, when respiration ceased. Artificial respiration was begun. Dilatation of the sphincter ani resulted in a single gasp. Death at 3.40 p. m.

AUTOPSY REPORT.

External examination.—Body that of a well-developed young adult male about 20 years of age, weighing about 160 pounds. Post-

¹ Extracted from an official report to the Bureau of Medicine and Surgery from the United States Naval Hospital, League Island, Pa.

mortem rigidity marked. Some post-mortem discoloration in dependent parts. No scars, wounds, or contusions. Slight amount of bloody fluid exuding from mouth.

Chest.—Thymus gland $1\frac{1}{2}$ inches long, 1 inch wide, and $\frac{1}{8}$ inch thick, pale yellow in color. No fluid in chest. Right pleural cavity completely obliterated by dense adhesions, apparently of long standing. Left pleural cavity normal in appearance. Lungs distended with dark, thick blood, which flowed freely from the cut surfaces and was confined to the blood spaces. Bronchi and bronchioles apparently free from blood. No clots or any great amount of mucus in the respiratory passages. After draining the blood from the lungs they collapsed. No areas of consolidation found.

Heart.—Free. No fluid in the pericardial sac. The organ was small and contracted. All valves intact. The chambers contained no clots. Aorta empty. The large veins were distended with dark blood.

Trachea.—Shows no blood clots or other obstructions. The mucosa is markedly injected. Glottis not obstructed.

Abdomen.—Stomach moderately distended. The contents consisted of a small amount of bloody mucus. The odor of ether was detected. Mucous surface appeared normal.

Spleen.—Dark-slate color, enlarged, and firm. It appeared to be distended with blood.

Other organs.—Normal.

Head.—Brain shows marked congestion. No evidence of inflammatory condition. No intracranial tumor or abscesses.

MEDICAL PROPHYLAXIS AGAINST VENEREAL DISEASES.

By P. W. DREIFUS, Lieutenant, Medical Corps, United States Navy.

Many difficulties are often encountered in the establishment and maintenance of prophylactic stations. The men, either from a sense of false modesty or due to the distance of the prophylactic station or ablution room from the place of exposure, fail to take treatment, or if treatment is taken it is often too late to be of benefit. The room should be located in a secluded but convenient and easily accessible spot, so that those applying have absolute privacy. No definite size will be applicable to every station; much depends upon the complement, location of ship or station, and opportunities afforded for exposure. However, a general plan will be outlined, which with modifications can be used under any conditions. Another important factor to consider is the attitude of the commanding officer and medical officer or officers concerned. This is especially illustrated by a chart taken from Otto May on "The Prevalence of Venereal Dis-

eases." It represents two barracks located in the same quarter of London. In A the medical officer took a special interest in the early treatment room, while in B he was indifferent.

Cases of venereal diseases.

	A. Average monthly strength 2,090.		B. Average monthly strength 1,850.	
	Actual No.	Incidence per 1,000 per annum.	Actual No.	Incidence per 1,000 per annum.
January-May, 1916.....	77	88	92	93
June, 1916-May, 1917.....	88	42	188	101
For the whole year, 1917.....		36		

Early treatment rooms opened in May.

It will thus be seen that in A the incidence was diminished by more than 50 per cent, while in B it actually increased during the "early treatment" period. The former figures indicate also the benefits of early treatment facilities under favorable conditions, the ablution room kept in a state of proper efficiency, and the men properly instructed by a zealous and enthusiastic medical officer.

Ablution room.—A room 16 feet long and 10 feet wide usually will accommodate the men applying for treatment. It should be well lighted and ventilated and kept scrupulously clean. In order that the floor may frequently be washed, it is advisable to have it made of concrete. Along one side of the room the treatment trough is to be located. This consists of either urinals or drains. Not absolutely necessary but highly important is a small inclosure around each urinal, in order to afford patients such privacy as they may desire. Along the opposite side place washstands of modern plumbing. Soap and paper towels should be available. It is essential that a sufficient number of sterilized penis syringes be always ready for use. Directly after using the syringes should be placed in a jar containing a strong carbolic, bichloride, or other antiseptic solution. These syringes are to be removed later and boiled before again using. No two patients are to use the same syringe unless it has been sterilized by boiling. Each individual is to be supplied with a basin, a small amount of tincture of green soap, and a paper towel, so that he may thoroughly wash the parts. These basins are to be sterilized by boiling before being used again. This room should also contain a medicine cabinet, desk, and chair for the convenience of the hospital corpsman on duty. If this ablution room is not in or near the hospital, it is advisable to have an adjoining room

equipped with a gas stove and large receptacles for sterilizing the syringes, basins, etc.

Duties of hospital corpsman.—A hospital corpsman carefully trained in the method of prophylactic treatments should be in constant attendance. He should keep a careful record of the date, name, rate, station, time of exposure, town in which it occurred, and time of prophylaxis for each individual. The time of exposure and prophylaxis should be given in hours and minutes. He shall give each patient the necessary medicine and the necessary instruction and assistance to those who do not understand the method of procedure in prophylactic treatment.

Routine treatment.—1. The bladder should be empty.

2. A thorough washing of the parts with soap and water may be followed by an immersion in some mild antiseptic solution, as, for example, lysol or bicloride of mercury.

3. Two injections of either a 1 per cent protargol or a 10 per cent argyrol solution. The first injection need not remain in the urethra longer than a minute; however, the second should be retained for at least five minutes. Care should be observed not to allow the fluid to penetrate into the posterior urethra. This may be done by pressure with the finger at the posterior part of the canal. If argyrol is used staining of clothing will always occur, therefore it is advisable to inform patients that this staining can be removed by soaking in a solution of bichloride of mercury.

4. Calomel ointment 33 to 40 per cent should now be thoroughly rubbed by the patient over the penis and scrotum, paying special attention to the corona, frenum, and prepuce.

5. A piece of glazed paper, oiled silk, or other nonabsorbable material should be wrapped around the part and held in place by a bandage or cloth. This will serve the twofold purpose of keeping the ointment on the parts and protecting the clothing.

6. The patient should be instructed not to urinate for at least two hours.

BOOK NOTICES.

MASS PHYSICAL TRAINING, by *Joseph E. Raycroft, A. B., M. D., professor of hygiene and physical education. Princeton University. U. S. Infantry Association, Washington, D. C., 1920.*

Dr. Raycroft, from his permanent position and his temporary one as chairman of the athletic division of the Commission on Training Camp Activities, was well qualified for the task of compiling a book of this kind and has produced one which will have lasting usefulness, not only in the Army but in schools, colleges, Y. M. C. A.'s, athletic clubs, etc.

The striking features of the volume so far as its form is concerned are the good paper and clear type, the abundant and excellent illustrations, not introduced as padding, but to make the text plain, which they do in every case. As to the subject matter, a somewhat hurried perusal seems to show that all the plans for muscular activity are based on brain activity. This is absolutely sound as a psychological and a physiological principle. Without any visible effort thereto the whole trend of the system is away from the mechanical, the automatic. The more exercise approaches to play the greater the gain; the mere introduction of designations like "bucking broncho," "bear walk," "frog jump," has some value, and the necessity for thinking in "crows and cranes," "O'Grady," and other items of physical drill make for that interest and pleasure so essential for real benefit.

Valuable features of this comprehensive work are the chapters on "Efficiency Tests," "Group Games," "Stunts and Informal Contests," "Conduct of Meets, Gymkhanas, etc.," "Strategy and Tactics" of highly organized athletic games such as swimming, rowing, football, and baseball.

We heartily commend this eminently practical book, the product of brains, to our Navy morale officers and to fleet, division, and ship's athletic officers.

ADVANCED LESSONS IN PRACTICAL PHYSIOLOGY by *Russell Burton-Opitz, S. M., M. D., Ph. D. associate professor of physiology, Columbia University. W. B. Saunders Co., Philadelphia, Pa. 1920.*

An admirable volume, designed to supplement the Textbook of Physiology by the same author (reviewed in the last number of the BULLETIN), by serving as a guide for a practical series of experi-

ments and demonstrations. Teachers and students of physiology will find the book eminently practical as a syllabus for laboratory work. The apparatus actually required, not all that might be used, are pictured and described. Each essential step is outlined. Methods of testing function, etc., the dissection necessary, the reagents required, are given in brief. There are blank pages for annotations.

PHARMACEUTICAL BACTERIOLOGY by *Albert Schneider, M. D., Ph. D., professor of pharmacognosy, University of Nebraska.* P. Blakiston's Son & Co., Philadelphia, Pa. Second edition, 1920.

A comprehensive work beginning with a history of bacteriology, the morphology and physiology of the bacteria and bacteriological technique, and ending with suggestions for the installation and conduct of a microanalytical and bacteriological laboratory. A vast amount of useful and interesting material has been gotten together, so that the single volume gives the bulk of what had before to be derived from half a dozen books. It presents the bacteria, ferments, yeast, molds, etc., from the standpoint of their industrial as well as hygienic and pathological standpoint, and may safely be recommended as a comprehensive reference book for advanced students of pharmacy.

THE MICROBIOLOGY AND MICROANALYSIS OF FOODS by *Albert Schneider, M. D., Ph. D., professor of pharmacognosy, University of Nebraska.*

Somewhat smaller than the above and intended as a practical working guide in the study of decomposition changes in food due to bacteria.

REGIONAL ANESTHESIA by *B. Sherwood Dunn, M. D., Colonel, Service de Santé Militaire de Paris.* F. A. Davis Co., Philadelphia, Pa., 1920.

This is a summary of the methods of regional anesthesia practiced by Victor Panchet and his disciples as contrasted with the better known infiltration method of Reclus. In the first chapter the arguments for regional anesthesia are marshaled in a very convincing way; next the necessary armamentarium and routine measures are discussed. The remainder and the greater part of the work is taken up with a description of the anesthesia of different regions.

The book is very well written and thoroughly practical. For some of the deeper and more difficult punctures there seems to be rather a scarcity of anatomical details as guides, but it may be that the directions are ample in conjunction with preliminary practice on the cadaver which is strictly enjoined. There are numerous illustrations.

HEALTH HABITS, MAKING THE MOST OF LIFE, THE BODY IN HEALTH, three volumes by *M. V. O'Shea, professor of education, University of Wisconsin, and J. H. Kellogg, superintendent Battle Creek Sanitarium.* The Macmillan Co., New York, N. Y., 1919.

These volumes of handy size and well printed, belong to a "Health Series of Physiology and Hygiene," and can be unreservedly recommended to parents and teachers. The one entitled "Health Habits" is that best adapted to younger children. The very appropriate and well-executed illustrations on almost every page afford in themselves a striking argument for the principles advocated.

INDEX TO UNITED STATES NAVAL MEDICAL BULLETIN.

VOLUME XIV.

INDEX TO SUBJECTS.

[Articles not appearing in full in the BULLETIN are marked (ab).]

	Page.
Abdominal, incisions, asepsis of.....	208
Accidents, automobile.....	450
Alcoholism, English statistics on.....	446
Ambulance boat.....	289
American Library Association.....	669
American Society for the Control of Cancer.....	443
American Founders of Gynecology.....	373
American Peace Commission.....	500
Amputations, war (ab).....	658
Anaphylaxis, relation of, to Asthma (ab).....	404
Anesthesia, death from.....	158
Anesthesia, rectal ether (ab).....	276
Anesthesia, from drugs administered by the mouth (ab).....	422
Anesthesia, National Society.....	285
Anesthetics in throat surgery (ab).....	665
Annapolis, anthropometric study at.....	1
Annual Report of Surgeon General, 1919, omissions in.....	286
Anthropometric study at Annapolis.....	1
Appendicitis amongst sailors (ab).....	275
Appendicitis and ascariasis.....	394
Arabians, The, and the First Revival of Learning.....	225
Army and Navy Club, a new.....	672
Arsenical poisoning, delayed.....	653
Arsenical preparations used intravenously.....	679
Arsphenamine in malaria.....	643
Ascariasis and appendicitis.....	394
Asepsis of abdominal incisions.....	208
As seen from within.....	632
Asthma and eczema, relation of anaphylaxis to (ab).....	404
Atrophy optic.....	641
Automobile accidents.....	450
Babinski, reflex (ab).....	411
Barton, W. P. C., First Chief of Bureau Medicine and Surgery.....	448
Barracks receiving ship, New York.....	163
Benzyl benzoate (ab).....	403
Birth control (ab).....	425
Birth rate, Manila.....	159
Blane, historical sketch of.....	611
Blindness, statistics of.....	160
Blood pressure (ab).....	273
Blood pressure estimation, information re.....	450

	Page.
Boat, ambulance.....	289
Bone cases.....	512
Bone infection resembling sarcoma, a case of.....	552
Bone surgery.....	283
Bone, transplantation of (ab).....	276
Book notices.....	309, 505, 718
Bookworm, the passing of.....	443
"Bring forth your dead".....	381
Bronchopulmonary spirochetosis.....	149
Calcium chloride intravenously for hemoptysis.....	210
Calculus, ureteral.....	644
Cancer, Society for Control of.....	443
Carbon-tetrachloride poisoning.....	155
Carbuncle, Carrel-Dakin technique in treatment of.....	549
Carelessness, scientific basis of (ab).....	670
Carrel-Dakin technique for empyema.....	527
Carrel-Dakin technique in treatment of carbuncle.....	549
Carrel-Dakin treatment, wound closures after.....	553
Catarrhs, treatment of respiratory.....	647
Celebrations, centenary.....	156
Cement floors, treatment of.....	638
Centenarian, medical.....	675
Centenary celebrations.....	156
Chelsea Naval Hospital, history of.....	311
Chondrodysplasia with exostoses.....	243
Civil-service positions.....	155
Clinical notes.....	149, 243, 391, 639
Control of druggists in Michigan.....	445
Corporation philanthropy.....	162
Correction of nasal deformities (ab).....	666
Cough, "tea taster's".....	669
Crescents, malarial.....	395
Crushed extremities, treatment of (ab).....	656
Death from ether due to status lymphaticus.....	714
"Deer-fly disease".....	156
Deformities of nose (ab).....	666
Degrees conferred by Royal College of Surgeons of Edinburgh.....	286
Delayed arsenical poisoning.....	653
Delinquency, problems of (ab).....	412
Dermatitis in industrial work.....	675
Device, evacuation, emergency.....	145
Devices, suggested.....	137, 237
Diabetes mellitus, study of two cases.....	345
Diet sheet for nephritics.....	651
Differential diagnosis between trachoma and follicular conjunctivitis (ab).....	432
Disease, Osgood Schlatter's.....	516
Disinfection of tubercular sputum (ab).....	659
Dominican Republic, venereal disease in.....	681
Druggists, control of, in Michigan.....	445
Economic loss from rats.....	674
Eczema and asthma, relation of anaphylaxis to (ab).....	404
Editorial.....	127, 381, 629

	Page.
Education, municipal, in Detroit	285
Educational movement in United States Army	450
Educational prophylaxis	383
Egyptian Medical School	450
Eight-hour law, French	160
Empyema, Carrel-Dakin technique for	527
Encephalitis Lethargica	151, 249
Encephalomyelitis in Australia (ab)	413
Enema, high (ab)	406
Epilepsy, Jacksonian, a case of	551
Epinephrin in testing thyroid function	649
Epitaph of twelfth century physician	677
Erythema Multiforme	399
Ether in Peritonitis	557
Ether, death from, in status lymphaticus	714
Evacuation device, emergency	145
Exostoses of chondrodysplasia	243
Facial and jaw injuries	17
Female medical matriculates	286
Fever, yellow	200
First chief of the Bureau of Medicine and Surgery, W. P. C. Barton	448
Fish, jelly, poisoning, by	396
Flat foot in the Navy	359
Flat foot ladder, the	240
Flight of mosquitoes	674
Floors, cement, treatment of	638
Foot, sarcoma of	550
Foreign body in the head, a case of	254
Founders of naval hygiene, Lind, Trotter, and Blane	563
Fractured metacarpal bone, open treatment of a	263
Fractures of anterior tuberosity of the tibia and Osgood-Schlatter's disease	516
Fractures, open treatment of (ab)	655
French hospital ship	675
French Navy, medical personnel of	156
French eight-hour law	160
Frontal sinus drainage (ab)	664
Gall-bladder and appendix, referred symptoms in diseases of (ab)	416
Garbage, disposal	237
Gas gangrene, two cases of	257
Gas, mustard	268
Gastric ulcer with perforation	259
Girl, the neurotic	444
Goitre, simple, prevention of	446
Granuloma, ulcerating (ab)	663
<i>Great Northern</i> , U. S. S., grounding of	185
Gynecology, American founders of	373
Health conditions in Santo Domingo	453
Hemoptysis, calcium chloride intravenously for	210
High enema (ab)	406
Historical	103, 225, 373, 563
History of U. S. Naval Hospital, Chelsea, Mass	311
History of U. S. S. <i>Pocahontas</i> during the war	460

	Page.
Hospital Corps, instruction of the	338
Hospital garbage disposal	237
Hospital records	213, 698, 706
Hospitals, standardization of	629
Hospital service, Oklahoma City	159
Hospital ship, French	675
Hospital standards	629
Hospitals, military orthopedic	65
Humerus, osteoma of	552
Hygiene, oral (ab)	431
Hygiene of submarines	8
Hygiene, naval founders of	563
Incisions, asepsis of abdominal	208
Industrial work, dermatitis in	675
Influenza, pilocarpine in	158
Influenza, value of quarantine in	448
Information on blood-pressure estimation	450
Injuries, facial and jaw	17
Injuries, nerve (ab)	658
In memoriam	135, 389
Insanity as a defense in crime (ab)	408
Interdental ligation for jaw fractures	391
Interesting bone cases	512
Internal ophthalmoplegia	260
Intestinal stasis, chronic	545
Instruction of the Hospital Corps	338
Intracranial pressure (ab)	420
Intramuscular injections of quinine in malaria (ab)	273
Is educational prophylaxis effective?	383
Italian medical officers, pay of	443
Jacksonian epilepsy with spastic contracture, a case of	551
Jaw and facial injuries	17
Jaw fractures, interdental ligation for	391
Joint treatment by Willems's method, a case of	545
Joints, war wounds of	537
Kidney, Traumatic rupture of	266, 397
Laboratories in Poland	284
Left-handedness (ab)	433
Legation guard, American, Managua, Nicaragua	684
Leprosy, treatment of	672
Lethargic encephalitis	151, 240
Library, association, American	669
Lice, destruction of by steam (ab)	277
Lind, historical sketch of	564
Malaria, arsphenamine in	643
Malaria, intramuscular injections of quinine in (ab)	273
Malaria, treatment of	367
Malarial crescents	395
Malposition, a case of	271
Managua, Nicaragua, American legation guard	684
Manila, birth rate of	159
Martin, William	389
Matriculates, female medical	281

	Page.
Medical prophylaxis against venereal disease.....	715
Medical quarterly, a new	673
Medical school, Egyptian.....	450
Medical school, Vanderbilt.....	285
Medical school of the University of Virginia.....	673
Medical sciences, progress in.....	273, 401, 647
Medical training in London.....	672
Medicine, Paris, faculty of, expansion of.....	159
Mental defects in the United States.....	669
Metacarpal fracture, treatment of.....	263
Milk, streptococci in (ab).....	430
Mosquitoes, flight of.....	674
Municipal education in Detroit.....	285
Mustard gas and the cardiovascular system.....	268
Mutual Aid Association, Navy.....	672
Nasal deformities, Correction of (ab).....	666
Navy ambulance Boat No. 1, United States.....	289
Navy French, Medical personnel of.....	156
Navy Mutual Aid Association.....	672
Navy recruiting.....	371
National Anesthesia Research Society.....	285
National Research Council.....	284
Negritos of the Philippine Islands (ab).....	435
Nephritis, Diet sheet for.....	651
Nerve injuries of the war.....	658
Nerves, peripheral, surgery of (ab).....	415
Nervousness of the Jew (ab).....	410
Neurological and Psychiatric Cases, Types of.....	191
Neurotic girl.....	444
Nicaragua, Managua (Legation guard at).....	684
Nose, deformities of (ab).....	666
Norton, Oliver Dwight, jr.....	389
Notes and comments.....	155, 281, 443, 669
Notes Clinical.....	149, 243, 391, 639
Novarsenobenzol subcutaneously.....	674
Obizus, Epitaph of.....	677
Occupational Therapy.....	536
Ocular complications due to Typhoid Inoculations (ab).....	286
Ocular phenomena in the Psychoneuroses of warfare (ab).....	278
Oklahoma City, Free hospital service in.....	159
Omissions in annual report of Surgeon General, 1919.....	280
Open treatment of fractures.....	655
Ophthalmitis in Secondary Syphilis.....	639
Ophthalmoplegia, Internal.....	260
Optic atrophy, Two cases of.....	641
Oral hygiene (ab).....	431
Orthopedic hospitals, military.....	65
Osgood-Schlatter's disease and Anterior Tuberosity of tibia, Fractures of.....	516
Osteoma of the Humerus, Case of.....	552
Osteomyelitis, treatment of.....	255
Parker, E. G., Biographical sketch.....	135
Passing of the bookworm.....	443
Pay of Italian Medical Officers.....	443

	Page.
Peace Commission, American.....	500
Peripheral nerves, Surgery of (ab).....	415
Peritonitis, Ether in.....	557
Personnel, medical, French Navy.....	156
Phalanx, Supernumerary.....	265
Philanthropy, Corporation.....	162
Philippine Islands, Negritos of (ab).....	435
Physical Development in the Navy.....	293
Physical Therapy.....	535
Pilocarpine in influenza.....	158
Pneumonia, Open air treatment of.....	153
<i>Pocahontas</i> , U. S. S., history of.....	460
Poisoning by arsenical preparations.....	653
Poisoning by carbon tetrachloride.....	155
Poisoning by jelly fish.....	396
Poland, Laboratories in.....	284
Potassium-mercuric-iodide.....	675
Pressure, intracranial (ab).....	420
Prevention of simple goiter.....	446
Problems of delinquency (ab).....	412
Progress in medical sciences (see medical sciences).....	273, 401, 647
Prohibition in Chicago.....	157
Prohibition, Italian view of.....	157
Prophylactic packet, the case against the.....	671
Prophylaxis, educational.....	383
Prophylaxis, venereal.....	715
Protection of the skin in surgical operations (ab).....	422
Psychiatric and neurological cases, type of.....	191
Psychoneuroses of warfare, ocular phenomena in the (ab).....	278
Quarantine, value of, in influenza.....	448
Radium (ab).....	414, 676
Rats, economic loss from.....	674
Receiving ship barracks, New York.....	163
Records, hospital.....	213, 698, 706
Recruiting, Navy.....	371
Rectal ether anesthesia (ab).....	276
Referred symptoms in diseases of gall-bladder and appendix (ab).....	416
Relation of anophylaxis to asthma and eczema (ab).....	404
Reports.....	163, 289, 453, 679
Reservist, impressions of a.....	188
Respiratory catarrhs, treatment of.....	647
Roentgen-ray problems (ab).....	424
Rome, medicine in.....	103
Ross, John Wolton.....	389
Rupture of kidney, traumatic.....	397
Ruptured kidney, a case of.....	266
Sanitary conditions in Vladivostok.....	689
Sanitary education, an experiment in (ab).....	430
Santo Domingo, health conditions in.....	453
Santo Domingo, venereal disease in.....	681
Sarcoma of the foot, a case of.....	550
Sarcoma of the foot, bone infection resembling.....	552
Scientific basis of carelessness (ab).....	670

	Page.
Scuttle butts, suggested changes.....	137
Secondary syphilis, ophthalmitis in.....	639
Serum in yellow fever.....	156
Simple goiter, prevention of.....	446
Sinus, frontal, drainage (ab).....	664
Situs inversus.....	157
Skin-suture material, a new (ab).....	423
Skin, protection of (ab).....	422
Solar therapy.....	673
Special study for medical officers.....	127
Specimens, requests for.....	156
Speech defects.....	286
Spirochetosis, bronchopulmonary.....	149
Sputum, tubercular, disinfection of (ab).....	659
Standardizing hospitals.....	629
Stasis, chronic intestinal.....	545
Static back trouble (ab).....	401
Static defects of the lower extremities.....	365
Statistics of blindness.....	160
Statistics of alcoholism, English.....	446
Status lymphaticus, death from.....	714
Sterility, treatment of.....	158
Stopping, temporary, for teeth.....	394
Storage batteries, testing water of.....	502
Streptococci in market milk (ab).....	430
Study of two cases of diabetes mellitus.....	345
Submarine service, medical and hygienic aspects of.....	8
Suggested devices.....	137, 237, 637
Supernumerary thumb.....	265
Surgeon General, Report of, omissions in.....	286
Surgery of peripheral nerves (ab).....	415
Surgical activities at the Naval Hospital, New York.....	511
Surgical operations, protection of the skin in (ab).....	422
Syphilis, a case of vascular.....	245
Syphilis and the war (ab).....	281
Syphilis in railroad employees (ab).....	660
"Tea-taster's" cough.....	669
Testing water for storage batteries.....	502
Tests of thyroid hypersensitiveness.....	649
Tetrachloride, carbon poisoning, by.....	155
"The case against the prophylactic packet".....	671
Therapy, physical.....	535
Therapy, occupational.....	536
Therapy, solar.....	673
Thilerium hominis (ab).....	407
Throat surgery, anesthetics in (ab).....	665
Thyroid hypersensitiveness, tests of.....	649
Tonsillectomies, report of.....	296, 505
Trachoma and follicular conjunctivitis, differential diagnosis be- tween (ab).....	432
Transplanting of bone (ab).....	276
Traumatic rupture of kidney.....	397
Treatment of catarrhs, respiratory.....	647

	Page.
Treatment of cement floors.....	638
Treatment of crushed extremities (ab).....	656
Treatment of joints.....	537
Treatment of leprosy.....	672
Treatment of malaria.....	367
Treatment of open fractures (ab).....	655
Treatment of typhus (ab).....	406
Treatment of war amputations (ab).....	658
Tropical Australia (ab).....	438
Trotter, historical sketch of.....	575
Tuberculosis in San Francisco (ab).....	430
Tubercular sputum, disinfection of (ab).....	679
Two cases of optic atrophy.....	641
Typhoid carriers, detection of (ab).....	428
Typhoid fever, in New York.....	286
Typhoid fever in vaccinated troops (ab).....	427
Typhoid inoculation, effect of, on eye (ab).....	280
Typhus, treatment of, (ab).....	406
Ulcer, gastric.....	259
• Ulcer of sigmoid flexure.....	269
Ulcerating granuloma (ab).....	663
University of Virginia, medical school of.....	673
United States Army, educational movement in.....	450
United States Naval Hospital, Chelsea, Mass., history of.....	311
U. S. S. <i>Northern Pacific</i> , grounding of.....	185
U. S. S. <i>Pocahontas</i> , history of, during the war.....	460
Ureteral calculus.....	644
Vanderbilt Medical School.....	285
Vascular syphilis, a case of.....	245
Venereal disease in California.....	286
Venereal disease in Dominican Republic.....	681
Venereal disease, medical prophylaxis against.....	715
Venereal prophylaxis at Great Lakes, Ill.....	295
Vincent's disease (ab).....	274
Vision test apparatus.....	637
Vladivostok, sanitary conditions in.....	689
Yellow fever.....	200
War amputations (ab).....	658
War osteomyelitis, the late treatment of.....	255
War wounds of the joints.....	537
Water for storage batteries, testing of.....	502
Willems's method of joint treatment.....	545
Wound closures after Carrel-Dakin treatment.....	553
Wounds of the joints, war (ab).....	537, 545
Yellow fever, serum treatment of.....	156, 684
Yellow fever in Nicaragua.....	684

INDEX TO AUTHORS.

[Articles not appearing in full in the BULLETIN are marked (ab).]

	Page.		Page.
Allen, A. H.	396	Farwell, W. G.	163
Ammerman, C. C.	245	Ferguson, D.	153
Auerbach, R. W.	263	Fickel, W. H.	210
Arnold, A. (ab)	655	Ficklen, A. (ab)	422
Arnould, E. (ab)	659	Fones, A. C. (ab)	431
Baker, B. G.	293	Friedman, E. D. (ab)	411
Beam, H. A. (ab)	415	Gaillie, W. E. (ab)	276
Beeley, A. L. (ab)	433	Garber, J. P. (ab)	431
Bell, W. L.	283	Giltner, H. W.	637
Berger, H. C. (ab)	404	Goetsch, E. (ab)	649
Blackwood, N. J.	311	Golseth, G. (ab)	432
Blender, D. R.	295	Goodman, H. (ab)	663
Bogert, E. S.	679	Groesbeck, B.	681
Boice, J. M. (ab)	403	Hakansson, E. G.	394
Boland, M.	460	Hammond, R. (ab)	65, 424
Bowman, F. H.	208, 397, 511	Hannah, B. (ab)	653
Brehmer, H. E. (ab)	660	Harvey, H. E.	394
Breinl, A. (ab)	438	Holladay, G. G.	259
Brown, E. W.	8	Hutchinson, R. H. (ab)	277
Buell, E. E. (ab)	431	Hutchinson, R. W.	243
Burrows, L. A.	295	Hyatt, T. P. (ab)	431
Calhoun, F. P. (ab)	280	Johnson, L. W.	17
Camerer, C. B.	641	Jones, F. S. (ab)	430
Cechla, W. H.	371	Judy, A. S.	689
Clayton, J. C. (ab)	276	Jump, H. D. (ab)	406
Cleland, J. B. (ab)	413	Kahn, M. H. (ab)	273
Colcorn, D. H.	670	Kerr, W. M.	338
Coleman, H. R.	269	Kirk, E. C. (ab)	431
Cooley, E. L. (ab)	401	Krepps, R. M.	163
Cottle, G. F.	460	Kuhlmann, A. E.	151, 245
Crandon, L. R. G.	188	Landis, H. R. M. (ab)	430
Craver, L. F.	345	Lanford, C. W. (ab)	414
Czubak, M. F.	399	Lewis, G. W.	149
Delrez, L.	537	Longabaugh, R. I.	249
De Napoli, F. (ab)	281	MacDonald, C. F. (ab)	408
De Schweinitz, G. E. (ab)	278	Marsteller, A. A.	365
De Witt, D. V.	289	McClintock, G. L.	641
Dreifus, P. W.	715	McCord, C. P. (ab)	446
Dublin, L. I. (ab)	425	McLean, A. D.	500
Dunbar, A. W.	714	Meadar, F. M. (ab)	428
Estes, W. L. (ab)	656	Michael, W. H.	268, 367, 395
Evans, G. H. (ab)	430	Murdock, F. F.	684
Farenholt, A.	237, 638	Murdy, W. F.	391

	Page.		Page.
Myerstein, A. (ab)-----	410	Sinclair, J. A. B.-----	137
Newton, P. (ab)-----	435	Smith, C. H. V. (ab)-----	653
Ochsner, E. H. (ab)-----	423	Smith, H. W.-----	698
O'Hare, J. P. (ab)-----	651	Solhaug, S. B.-----	1
Orr, T. G.-----	658	Soresl, A. L. (ab)-----	422
Painter, C. F.-----	359	Stokes, J. H. (ab)-----	660
Peckham, C. F. (ab)-----	407	Strathy, G. S. (ab)-----	653
Phillips, A. B. (ab)-----	658	Taylor, C. J. C. (ab)-----	275
Pleadwell, F. L. (ab)-----	448	Taylor, E. C.-----	191
Price-Jones, C. (ab)-----	274	Taylor, J. S.-----	103, 127, 145, 225, 373, 381, 563, 629
Pringleau, P. F.-----	644	Tieck, G. J. E. (ab)-----	666
Reed, E. U.-----	706	Tollinger, A. C.-----	271
Reeves, R. S.-----	265	Unger, L. (ab)-----	427, 664
Richardson, R. R.-----	266	Vall, W. P.-----	296
Riggs, C. E.-----	135	Vann, J. W.-----	681
Robertson, D. E. (ab)-----	276	Walker, R. C. (ab)-----	446
Rogers, C. C. (ab)-----	420	Walsh, E. F. (ab)-----	651
Rolleston, H. (ab)-----	416	Whitmore, W. H.-----	639
Ruddock, J. C.-----	185	Wilson, T.-----	200
Salmon, T. W. (ab)-----	412	Wiltshire, H. W. (ab)-----	273
Salisbury, E. I.-----	255	Wood, H. C. (ab)-----	647
Sausser, E. R. (ab)-----	431	Woodland, E. E.-----	290
Schmidt, L. M.-----	254, 257	Young, W. J. (ab)-----	438
Segal, J. (ab)-----	406	Zalesky, W. J.-----	644
Semple, D. (ab)-----	274		

